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AT HOME, 1801 LAMAR BOULEVARD

By the time this issue of the JOURNAL is distributed, the Texas Medical Association will have a new address: 1801 Lamar Boulevard, Austin, instead of 700 Guadalupe Street.

Earlier in August, workmen brushed on the final coats of paint, the decorators placed the furniture, and the building was accepted legally by the Board of Trustees. The move from the old quarters began immediately, and it is anticipated that when the final page of the August calendar is turned, the central offices and library of the Association will be firmly settled in the new building toward which much planning and labor have been directed in recent years.

Formal opening of the building is scheduled for the week-end of September 19-21. Dedicatory ceremonies featuring an address by the President of the American Medical Association, Dr. Louis H. Bauer, Hempstead, N. Y., will be held Friday evening, September 19. Dr. Bauer will be introduced by the Governor of Texas, Allan Shivers. Limitation of space and the desire of officials of the organization to permit leaders in business, education, labor, government, and other professions to attend these ceremonies mean that only those with a special invitation can be accommodated in the auditorium-lounge. Others, however, will be seated throughout the building and will hear the program by means of a public address system.

First event of the celebration actually will come ahead of the week-end. Thursday, September 18, the Executive Board of the Woman's Auxiliary to the Texas Medical Association will hold its autumn meeting. The session is set for 10 a. m. at the Austin Country Club. Friday the new building will be open for inspection by members of the medical profession and their families. A 5 p. m. program will pay tribute to past presidents of the Association with special silver medals struck for the occasion being presented to each president able to attend. An address by Senator Lyndon B. Johnson will be a part of this service. The dedicatory ceremonies will begin at 8 p. m. Saturday has been reserved for meetings of Association committees and of the Executive Council, which will convene at 2 p. m. Presentation of a bronze plaque to Dr. J. M. Travis of Jacksonville, named in May as

General Practitioner of 1952 for Texas, will be a part of the business of the Executive Council. These committee and Executive Council meetings will be held at the Commodore Perry Hotel. Sunday the new headquarters building will be on display to friends of the Association from Austin and elsewhere. The staff will be on duty throughout the entire period, and members of the Woman's Auxiliary will act as hostesses to show visitors the building.

Details of the program, together with pictures and stories about the building, the services that are carried on in it, and the growth of the Association activities necessitating a larger, fireproof structure to house the central offices and library will appear in the September issue of the JOURNAL, scheduled for distribution shortly before the ceremonies. The special section containing this material will be reprinted in booklet form for distribution to guests attending the various events in Austin and for mailing to organizations and individuals throughout the country to whom this milestone in Texas medicine will be of interest.

The officials of the Texas Medical Association and the employed staff which will occupy the new building take this means of inviting every member of the Association and Auxiliary to come to Austin for the festivities in September. If that is impossible, the doors of the edifice on Lamar Boulevard will swing wide for visitors at other times. It is the genuine hope of those who have watched the building grow from mere words, through architects' plans, to a pulsating reality that each member whose contributions of interest, time, and money have made the building possible will pay it a visit when he can.

Meanwhile, communications to the Texas Medical Association, its Library, JOURNAL, or any division, should be addressed from this date forward to 1801 Lamar Boulevard, Austin. The Association telephone number remains the same: 7-9447.

WINNING WAYS WITH PATIENTS

The American Medical Association has just released a small pamphlet entitled "Winning Ways with Patients." The pamphlet has gone to every doctor in the nation and warrants a great deal closer study than may actually be given it. The casual doctor reader is going to examine the pamphlet—if at all—with a lick and a promise and reflect to himself that the do's and don't's for doctors' secretaries are obvious to the extent that they hardly need collection and repeating. It would be a good thing for the medical profession if these tips on front office techniques really did not need repeating. The truth, however, is that one of the weakest links in medical-patient relations occurs in this self-same front office when a busy doctor's time does not allow him the opportunity to discover it, let alone do anything about it.

Survey after survey at state association and even national level has pointed out that one of the four major areas for bettering medical public relations exists in a more efficient, friendlier reception room. This very point has been selected by the Texas Medical Association's Committee on Public Relations as one of two requiring major stress this year.

Accordingly, the A. M. A. pamphlet is much more important to the Texas doctor than might first meet the eye.

Briefly, "Winning Ways with Patients" sets up an excellent guide for any doctor's secretary, whether she be a veteran in the business or a complete novice. From handling the mail to billing procedures to personal contact with patients in the office, it does a thorough job of idea starting. Every doctor's secretary in Texas should read and study this pamphlet. In addition, she should study the excellent series "Letters to a Doctor's Secretary" now appearing in *Medical Economics* and soon to be available on request to that magazine in bound form.

Extent of the recognition given this phase of medical public relations is borne out by the fact

that many leading county medical societies have already established associations of medical secretaries or clubs designed to train these young women to do a better job in the reception room.

Inescapable is the final hard, economic fact that those doctors who have thoroughly examined the problem of more efficiently run offices now find their collection ratio well above 95 per cent, which is a far better picture than the average Texas practitioner can boast.

TEXANS AS WORLD CITIZENS

Of the quota of 185 members in the World Medical Association assigned to Texas, only thirty-six memberships have been secured. Texas physicians with a cosmopolitan viewpoint should be interested in the relationship of this Association to the American Medical Association and to the World Health Organization.

At present forty-three nations through their national medical associations are represented in the World Medical Association. In addition to gaining new member nations, the Association hopes to improve substandard health conditions and medical care in the nations already members. If funds become available, the Association plans to send medical teams to areas lacking properly trained medical personnel so that they may receive the benefits of modern research and practice. In addition, it hopes to bring men from these areas to countries where they may be trained, then return them to provide better medical care in their own lands.

The World Medical Association is a separate entity from the World Health Organization, although the two groups have close liaison. The latter organization, a subsidiary of the United Nations, represents the governments of the world in the field of medicine. On the other hand, the World Medical Association represents the physicians of the world and their medical associations; it is nongovernmental and its funds are derived from dues and voluntary contributions.

The World Medical Association was formed September 18, 1947, in Paris. Since its first general assembly in that city, others have been held in Geneva, London, New York, and Stockholm. The sixth general assembly will be October 12-16, 1952, in Athens and a meeting of the medical editors of the world will be held the day after the assembly closes.

The Association has adopted a modification of the Hippocratic Oath called the Declaration of Geneva and an International Code of Medical Ethics. Its business affairs are conducted in semi-annual meetings of a Council elected by the General Assembly. When the Association was first organized, it was recognized that it could not function well without sufficient funds; consequently, a United States Committee was incorporated as a nonprofit organization in New York to underwrite the expenses of maintaining the Secretariat, certain expenses of the Council, and publication of *The World Medical Association Bulletin.*

Specific activities of the World Medical Association have included a survey of medical man power in the various countries, a survey of medical education in twenty-six countries, a survey of postgraduate medical education in twenty-eight countries, a study of cult practice in the various countries, a preliminary study of medical advertising, a survey of social security as it affects medical practice, and a quarterly ***Bulletin*** published in three languages.

Members of the United States Committee of the World Medical Association pay dues of $10 annually and are entitled to receive all the publications of the Association, including the *Bulletin.* Arrangements can be made for members traveling in foreign countries to visit medical schools and hospitals. Memberships are available for organizations, as well as individuals, and many medical organizations and organizations closely related to medicine are members of the Committee.

Those interested in becoming members may

write the Secretary-General at the Academy of Medicine Building, 2 East 103rd Street, New York 29.

In the turmoil of the present-day world there is much talk of world citizenship and the means for attaining an effective and lasting world peace, but there is not too much action. The objectives of the World Medical Association are sound, its methods for achieving them sensible. It follows that any physician who wishes to strengthen his role as a world citizen and to promote world peace through better health for all nations should support the World Medical Association.

TRUSTEE AND EXECUTIVE SECRETARY NAMED

N. C. Forrester, who has been acting Executive Secretary for about a year, was named Executive Secretary, and Dr. Sam N. Key, Austin, who has been serving as Secretary and as chairman of the Building Committee, was named Trustee to replace the late Dr. William M. Gambrell just as this JOURNAL went to press.

Another change is the appointment of Dr. Troy Shafer, Harlingen, as chairman of the Committee on Public Relations and of Dr. Frank W. Yeager, Corpus Christi, as councilor of the Sixth District to replace Dr. Shafer in that position.

Additional details about these changes in officials of the Texas Medical Association will appear in the September JOURNAL.

CURRENT EDITORIAL COMMENT

THERAPEUTIC USE OF GAMMA GLOBULIN

The gamma globulins are immunologically the most important of the globulin fraction of the blood proteins since they contain the antibodies with which the organism protects itself against certain diseases. These gamma globulins are concentrated from fraction 2 of pooled plasma by an application of the procedures utilized in fractionating human plasma. Such preparations are approximately twenty-five times as potent in antibody titer as pooled adult serum and thus require only a small volume to elicit the desired effects.

The therapeutic value of the gamma globulins in the prevention and treatment of human disease is still a subject for investigation. However, their value as a safe and effective means for the prevention and modification of measles has been well-established and the use of immune serum-globulin-human in measles prophylaxis is generally recommended. If given during the first few days after exposure, the disease will be prevented in 50 to 75 per cent of persons and its severity will be modified in an additional 25 per cent.

In addition to its use in measles, gamma globulin appears to be of value in infectious hepatitis although the data supporting this view is less conclusive. Its value as a preventive of paralysis in poliomyelitis is at present entirely speculative. Until such large scale experiments as are now being conducted in Houston are completed, it is impossible to conclude as to the use, if any, that gamma globulin may have in this disorder. Unfortunately, the publicity given to current experimentation has created a misdirected demand by some patients for the use of gamma globulin by their physicians as a preventive of poliomyelitis. Until the present experiments are completed, the material should not be used for this purpose. Such limited supplies of gamma globulin as are now available should be reserved for carefully controlled experimental studies and for use in the prevention and modification of the course of measles and infectious hepatitis.

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ORIGINAL ARTICLES

CHILDHOOD MALIGNANCIES
I. General Considerations

FLOYD A. NORMAN, M.D., Dallas, Texas

A REVIEW of the literature on juvenile cancer reveals conflicting views regarding the incidence, course, and general significance of this group of diseases. These conflicts are clearly referable to the difference in the age periods included in the material considered by the authors.

Guldberg[4] noted the proportion of tumors occurring before the age of 30 years to be 5.36 per cent, whereas Wildbolz[7] observed it to be 1.95 per cent. Helmholz[5] reported 750 tumors in children younger than 15 years of age at the Mayo Clinic, of which 97 per cent were sarcomas; however, at Memorial Hospital Dargeon[1] observed that 10 per cent of 218 malignant tumors in children were carcinomas.. Some authors considered chiefly epithelial tumors but others included both carcinomas and sarcomas, thus creating the confusion which inevitably results when one attempts to generalize about the entire group of neoplasms. Ewing[2] noted that none of these earlier authors emphasized that benign tumors in infants and children far outnumber the malignant ones although this fact probably disturbed their statistical conclusions.

TABLE 1.—*Deaths from Cancer* and Certain Communicable Diseases in Patients Younger than 20 Years of Age in Michigan, 1943-1947.*

Cause of Death	Year					Total
	1943	1944	1945	1946	1947†	
Cancer	130	129	125	157	169	710
Tuberculosis	180	193	170	174	134	851
Whooping cough	101	33	36	44	63	277
Acute rheumatic fever	58	49	42	25	27	201
Measles	85	44	9	47	4	189
Poliomyelitis	21	36	14	62	13	146
Diphtheria	15	29	39	21	18	122
Syphilis	15	27	31	20	12	105
Scarlet fever	9	6	4	2	5	26

*Includes leukemias and aleukemias.
†Provisional figures.
(Modified from Differential Diagnosis of Cancer in Childhood, Michigan Cancer Bull., vol. 2, no. 18, 1948.)

Other conclusions by the authors, who were mostly general surgeons dealing with the familiar forms of adult tumors, were that chronic irritation is responsible for the majority of cancers of childhood, while Cohnheim's theory of embryonal rests has a limited application, that heredity does not appear to have an important influence (Rosenberg), and that trauma is an important etiologic factor in tumors of children (Schad). Only as other data were accumulated did it become clear that in the first two decades of life many specific neoplastic diseases which are not encountered in later life are seen. Furthermore, the conditions of origin and the clinical course of these diseases are so peculiar that properly they may not be compared with any adult tumors (Ewing).

It is important to remember that death from neoplastic diseases stands high among the causes of childhood mortality.

TABLE 2.—*Distribution of Primary Tumors in Childhood.*

	Duzan 1876	Picot 1883	Dargeon	Helmholtz
Eye	70	100		
Kidney	45	80		
Testis	11	15		
Prostate	8	8		
Bones	5	67	79	121
Tongue	5	6		
Brain or central nervous system	5	31		327
Abdomen	5	19		
Lungs	4			
Dura mater	4			
Pancreas	3			
Liver	2	13		
Tonsil	2			
Rectum	2			
Stomach	1			
Skin	0	8		16
Mouth				56
Genitourinary system			17	56
Intestine	0	7		
Ovary	0	6		
Soft somatic tissue			41	18
Lymphoid tissue			33	141
Miscellaneous				
Total Cases	183	424	170	750

It may be seen from table 1 that in the five year period reported approximately 30 per cent of the deaths were from neoplastic diseases, slightly more than 30 per cent from tuberculosis, and the remaining 40 per cent from the other seven common and dreaded diseases.

The distinction between so-called benign and malignant tumors may be simply academic insofar as prognosis is concerned since a tumor histologically benign may cause death by pressure on adjacent structures or by interference with the vital function

Read before the Section on Pediatrics, Texas Medical Association, Annual Session, Dallas, May 7, 1952.
An abstract of the discussion of this paper follows the fifth paper of the symposium.

of organs. Early recognition of highly malignant tumors is of great importance since treatment in the early stages of their development may result in long survival periods and even cures, as in the case of Wilms's tumor, retinoblastoma, and neuroblastoma. Diligent attention to symptoms, proper examination, and a constant high degree of suspicion are necessary for early diagnosis.

The reports of distribution of tumors in childhood vary widely and show the difference in distribution in children and adults (table 2).

The wide variety of malignant tumors occurring in infancy is well reflected by the cases reported in the recent symposium on cancer in childhood by Dargeon[4] (table 3).

The Mayo Clinic classification of 427 brain tumors in children illustrates further the possible variety in one specific system of the body (table 4).

It is interesting to note that medulloblastoma is observed only in children.

In the literature are many isolated reports of peculiar tumors of infants and children, usually of

TABLE 3.—*Varieties of Cancer in Infants Reported in a Symposium.*

Malignancy	Age of Infant
Hodgkin's disease	2 yr.
Lymphosarcoma	3 yr.
Carcinoma of the testis	1 yr.
Myosarcoma of the round ligament	14 mo.
Carcinoma of the upper lip	20 mo.
Sarcoma of the tongue	At birth
Liposarcoma of the leg, congenital	Before birth
Rhabdomysarcoma of the thigh	2 mo.
Wilms's tumor of the kidney	1 yr.
Malignant synovioma	9 mo.

embryonal type and complex structure, affecting nearly every organ in the body. Most of the data on the teratologic relations of tumors are drawn from observations on infants. H. G. Wells[6] has surveyed the reported cases of congenital malignant tumors and noted a total of 256 cases, of which 68 were certainly, 66 probably, and 122 possibly acceptable as existing at or before birth.

It is obvious that the great majority of tumors of infants are of strictly embryonal type, and that many of them are of complex teratoid structure, indicating conditions of origin that fall under the concept of Cohnheim's theory. The embryonal nature is indicated by the large cells, nuclear hyperchromatism, and high water content, and frequently by the presence of glycogen granules. Faerber[3] pointed out that the retina, chorion, and renal blastema possess a high aerobic glycolytic metabolism similar to that of carcinoma. The exact factors controlling growth are probably inherent in the cells of the anlage, but they may be affected by hormonal influences as yet undetected or possibly by the stimulating influence of excessive functional activity.

Heredity may play a part in the incidence of tumors of infants and children, notably tumors of the peripheral nervous system, including the pigmented nevi. Data are inadequate to form definite conclusions. In general, it would seem that the majority of tumors of children are congenital rather than hereditary.

TABLE 4.—*Histologic Types of 427 Brain Tumors in Children Seen at the Mayo Clinic (1948).*

Histologic Type	No.	%
Astrocytoma	104	24.4
Medulloblastoma	86	20.1
Ependymoma	49	11.5
Glioblastoma multiforme	40	9.4
Craniopharyngioma	23	5.4
Sarcoma	16	3.7
Ependymoblastoma	14	3.3
Astroblastoma	14	3.3
Meningioma	11	2.6
Pinealoma	10	2.3
Pituitary adenoma	10	2.3
Other less common types	50	11.7
Total	427	100.0

281, or 65.8 per cent, were infratentorial.
146, or 34.2 per cent, were supratentorial.
(Modified from Differential Diagnosis of Cancer in Childhood, Michigan Cancer Bull., vol. 2, no. 18, 1948.)

As a rule malignant tumors of infants and children progress rapidly and metastasize widely, recurrence is prompt, and the mortality is high, although there are so many types of tumors that generalizations are of little value.

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POTENTIALLY DANGEROUS MOLES

Even though more than 99.9 per cent of all moles are harmless, some may turn into highly malignant, invasive, and promptly fatal cancer, warns Dr. Alfred P. Seltzer, Philadelphia, in a recent issue of *Today's Health*.

Every mole should not be removed; most moles need no treatment except for cosmetic reasons, the physician states. Moles which increase in size, bleed readily, or become irritated or inflamed may already have become cancerous and should be removed, Dr. Seltzer advises.

Dr. Seltzer points out that black moles, particularly blue-black, green-black, or slate colored moles, are prone to become malignant. Moles on the foot and in places exposed to constant irritation or chafing should be removed.

CHILDHOOD MALIGNANCIES
II. Pathologic Considerations

ALICE SMITH, M.D., Dallas, Texas

IN this part of the symposium an attempt will be made to give pathologic characteristics of childhood malignancies with emphasis on certain differences between the malignancies of childhood and adulthood, to present concepts as to pathogenesis and etiology, and to list clinically important tumors with their distinguishing features.

CHARACTERISTICS

Tumors in infancy and childhood appear histologically to reproduce definitive structures, or they may be composed of cells recognized as normal for the embryo but lacking the influence of organizing factors which determine development of viscera or any given tissue. This means microscopically the presence of numerous, fairly large, somewhat darkly staining cells with hyperchromatic nuclei, which are closely placed and not as strikingly variable as anaplastic tumors of adulthood. Not only do these tumors reproduce an appearance thought to be normal for a given embryonic period, but also tumor growth may parallel the rapid growth of the embryo and individual organs of the fetus.

Certain embryonal tumors, especially in the sympathetic nervous system, possess a capacity to pursue a normal course of differentiation instead of progressive malignant degeneration. A neuroblastoma, the malignant tumor of this system, may reproduce all stages in the development of sympathetic ganglion cells from primitive sympathogonia through the stage of sympathoblasts to mature ganglion cells. It may be rapidly fatal or may slowly mature into the benign ganglioneuroma. Factors responsible for such maturation of undifferentiated cells within a malignant tumor are unknown. This situation is not simulated in adult tumors. Certain embryonal tumors also may cease to be malignant, either spontaneously or after irradiation. Occasionally a retinoblastoma may undergo spontaneous cure by extensive necrosis; the previously mentioned neuroblastoma may show no indication of malignancy after irradiation.

The majority of embryonal tumors present themselves within the first few years of life; after the age of 5 years the incidence drops sharply, with such tumors being rare late in life.

From the Department of Pathology of the Southwestern Medical School of the University of Texas.
Read before the Section on Pediatrics, Texas Medical Association, Annual Session, Dallas, May 7, 1952.
An abstract of the discussion of this paper follows the fifth paper of the symposium.

In children the common areas where malignancies originate are the central nervous system, the eye, the kidney, the adrenal gland, and the hematopoietic system. Other less common sites include bone, liver, adrenal cortex, thyroid, thymus, gonads, and vagina. Only a small number are present in the endocrine glands, but when such tumors do occur, striking functional changes appear clinically because of the relationship of the endocrines to normal growth and developmental processes. Organs such as the breast, uterus, ovary, and prostate and the gastrointestinal tract, commonly involved in adults, are rarely involved in children. Carcinoma of the skin is almost unheard of in young children. Metastatic tumor involvement of lung is fairly common, but primary lung neoplasm is rare. Although nevi are universally present even at birth, malignant melanoma is relatively rare. Many neoplasms of childhood seem to be peculiar to this age group and are not seen to any considerable extent in later life.

In consideration of malignancies of childhood, a knowledge of the life history and behavior of a given tumor may be more valuable than mere examination of histologic characteristics. Histologic findings and clinical progress may be at variance. Factors which should be evaluated in dealing with certain tumors before the diagnosis of malignancy can be definite are invasion of regional tissues, intravascular extension, and presence or absence of a capsule. The hemangio-endothelioma is an interesting tumor in this category. According to Farber[6], it is a rapidly growing benign tumor simulating the behavior of malignant tumors. An apparent malignancy is seen histologically in large masses of endothelial cells with numerous mitotic figures and infiltration of adjacent glandular and soft tissues. Sometimes the tumor grows in blood vessels to appear at some distance from the primary mass. It may spontaneously regress because of obstruction of its own blood supply. It is rarely the cause of death, and then only by accident of location or by association with extensive hemorrhage.

Clinically there is a difference in the behavior of childhood tumors and the adult ones. The designated childhood malignancies tend to grow rapidly, to extend directly into the surrounding tissues, and to metastasize early by way of blood or lymphatic vessels; recurrences after removal often are prompt, and the mortality rate is higher. Designated tumors of adulthood, if occurring at early ages, tend to run a

more rapid course, and to metastasize more widely than when occurring in the usual age range. The terminal, cachectic state with slow, lingering death is not seen in children with the regularity that it is in the adult. As regards clinical diagnosis, Gaisford[7] called attention to the fact that except for intracranial tumors most tumors in children are either palpable or visible, thus differing markedly from adult tumors.

PATHOGENESIS

The most widely held theory as to etiology or pathogenesis of childhood malignancies was advanced by Cohnheim, who postulated that these neoplasms developed from masses of simple or complex tissue misplaced during embryonal development or from groups of superfluous cells which retained embryonal characteristics but remained in normal positions. In contrast to widely held concepts as to the etiology of adult tumors, there seems to be no evidence to incriminate trauma (except possibly in the case of bone neoplasms), chronic irritation, or the wear and tear factors of daily living in causation of childhood neoplasms; hormonal influences seem to be largely excluded. Little is known to implicate hereditary factors with the exception of well documented cases of familial retinoblastoma in the literature.

Ewing's analysis[4] of the problem brings out certain interesting facts concerning origin of these malignancies. He noted that the majority of the specific tumors of childhood occur between birth and the appearance of the second teeth (the beginning of the presexual period). From the eighth to the fifteenth year, there are fewer malignant tumors than at any time of life. He was of the opinion that causative factors of infancy may have exhausted themselves by this time. During the period of puberty from 15 to about 25 years, factors of nutrition approach those of adult life and growth impulses rapidly decline; in this period the tumors of adult life begin to appear while characteristic tumors of infancy are observed with diminishing frequency. New conditions of origin are effecting the appearance of new types of tumors.

If in accord with Cohnheim's theory an embryonal disturbance is postulated leading to the isolation of tissue rests in the embryo before birth, then most tumors of infants and children are essentially congenital, though not clinically demonstrable until some years later. H. G. Wells[10] collected and reviewed 250 cases of neoplasms, certainly or possibly true malignant growths present at birth, of which 66 were established without doubt. In his group sarcomas constituted nearly one-half of the total number with a smaller number of instances of neuroblastoma. Not a single case of congenital carcinoma could be definitely established. As compared with other tumors, a larger portion of recorded cases of neurogenic malignant tumors derived from the sympathetic nervous system and the retina are present at birth. Of the malignant tumors which may be congenital, only the retinoblastoma shows a familial or hereditary influence. Cases of true congenital leukemia also have been reported.

COMMON MALIGNANT TUMORS

Most malignant tumors of childhood fall into the following classifications given by Andersen[1]: tumors of the central nervous system, retinoblastomas, lymphomas (including leukemia, Hodgkin's disease, and lymphosarcoma), bone tumors, tumors of the kidney and adrenal gland, soft tissue tumors of mesodermal origin, malignant teratomas, and infrequent instances in older children of tumors usually found in the adult.

Tumors of Central Nervous System.—Two types of intracranial neoplasms are common in childhood—medulloblastoma and astrocytoma, both subtentorial tumors. Medulloblastoma is the highly malignant type of glioma which arises from embryonic rests situated just above the fourth ventricle, usually in the vermis of the cerebellum, and which spreads by implantation to other parts of the cerebrospinal axis. The tumor cells migrate by way of the cerebrospinal fluid pathways. Histologically, medulloblastoma is similar to neuroblastoma. The relatively benign, slowly growing astrocytoma usually arises in the cerebellar hemispheres and often contains cystic spaces. Morphologically this tumor contains fibrillary or protoplasmic astrocytes in varying proportions. Sudden massive hemorrhage into a cystic space of an astrocytoma may cause a sudden increase in size of the tumor. This may mean that medullary centers are embarrassed by increased pressure or are damaged as a result of anoxia due to circulatory changes consequent to enlargement of the cyst.

Retinoblastomas.—Retinoblastoma, thought to arise from the neuroepithelium of the retina, occurs almost exclusively in infants and young children, becoming apparent within the first two years. The onset may occur in utero. A small round, yellowish-white nodule on the retina is usually the first focus; this nodule is soon surrounded by small satellites, which spread on the inner surface of the retina with polypoid extensions into the vitreous humor. Spread may occur in the subretinal space with the formation of a tuberous deposit on the outer surface of the detached retina. No pigmentation is present. It is thought that this growth may be present from six to twelve months before being manifest clinically; in about 30 per cent of cases the tumor is bilateral, each growth independent of the other. Spread of tumor is by way of the optic nerve and blood stream, especially if the choroid coat is involved. Extraocular extension along the optic nerve means that recurrence in the orbit

after enucleation is likely and that there is a possibility of early death because of cerebral involvement. Metastatic foci are prominent in regional lymph nodes, cranial bones, and lungs.

Histologically the tumor shows characteristics of embryonal tumors of neurogenic origin — rosette formation, perivascular clustering, and a tendency toward necrosis. Differentiation may be present in simulation of rods and cones, and the rosettes may have an inner limiting membrane suggesting the external limiting membrane of the retina.

Lymphomas.—The malignant lymphomas, including Hodgkin's disease and lymphosarcoma, are characterized by a fatal, chronic, progressive, and painless involvement of lymph nodes and lymphoid structures in one or more regions of the body. With this kind of involvement there is obliteration and distortion of normal lymph node architecture and lymphoid arrangements. In the group of malignant lymphomas, morphologically a single type of cell in the lymphoid series predominates. In Hodgkin's disease the histologic picture is heterogeneous by comparison; a polycellular infiltrate is associated with proliferation of reticulo-endothelial cells, some of which assume giant forms, the Reed-Sternberg cells, and an irregular fibrosis.

Leukemia is an invariably fatal systemic disease primarily characterized by widespread, rapid, and disorderly proliferation of leukocytes and their precursors, and by the presence at some time during the course of the disease of immature forms of leukocytes in the blood.[2] Leukemia tends to be relatively uncommon in children by comparison with its incidence in adults. On the basis of duration of the clinical course and predominant cell type in blood and bone marrow, leukemia is classified as acute, subacute, or chronic and granulocytic, lymphatic, or monocytic. The acute forms are more common in young children; less acute forms tend to be present only in persons older than 8 years. In children the leukemic cell is often so primitive that its classification may be difficult, and the terms "stem cell" or "preblast" may be used. The anatomic changes of leukemia relate to the presence of the so-called "leukemic infiltrates" within various viscera; widespread involvement of the skeletal system; enlargement of spleen and liver; variable enlargement of lymph nodes; and signs of involvement of bone marrow with destruction of hematopoietic centers, resulting in ecchymoses and a tendency toward free bleeding. This invasion of bone marrow is an invariable accompaniment to leukemia in childhood.

Bone Tumors.—In all forms malignancies of the bone show a distinct predilection for children and young adults. The two common ones are osteogenic sarcoma and Ewing's endothelioma. In a large percentage of cases a recent history of trauma to the affected area is obtained and the injury seems to be causally related, although this relationship may not be at all clear. Osteogenic sarcoma is a tumor thought to reproduce various stages in the embryogenesis of bone with either an irregular admixture of related processes or a predominance of one. Consequently the morphologic picture may be that of cartilage in various stages of development, osteogenesis with osteoid tissue deposition and subsequent ossification, or resorption and vascularization of bone tissue previously formed. Osteogenic sarcoma is a highly malignant tumor usually seen in the metaphyseal end of a long bone; it progresses rapidly and metastasizes by blood stream to lungs, subsequently to various sites. As to direction of growth, such a tumor may progress either centrally within the shaft of the long bone, producing bone destruction and possibly pathologic fracture, or peripherally, encroaching upon soft tissues and, because of periosteal elevation, eliciting reactive bone formation. Ewing's endothelioma is an embryonal tumor of debated histogenesis; it may begin in any bone but usually begins in the shafts of the long bones and in pelvic bones. This tumor occupies the marrow cavities and is associated with hemorrhage and necrosis and not with new bone formation. With progression of the disease, other bones are involved and eventually metastases in other organs are seen.

Tumors of Kidney and Adrenal Gland.—Wilms's tumor is usually manifest clinically in the second and third year of life. It is a rare case that is seen in persons older than 14 years. Of interest is a case of uterine dystocia due to a large tumor of this type which has been reported. This encapsulated, lobulated tumor arises in no constant location within the kidney. Hemorrhage and necrosis are frequently present within the tumor and may lead to rupture of the capsule with direct extension of tumor into regional tissues. Extension commonly occurs into the ureter or renal veins. Blood stream metastasis is to lungs and from thence to brain. It is thought such a tumor may remain small for quite a period, but once growth begins, the tumor increases in size at a rapid rate. A rapid increase in size also may be associated with massive hemorrhage into the tumor. This is a tumor which should be considered early when differentiation of an abdominal mass is in question, and the odds that such a mass in a child is renal in origin are 10 to 1. Origin of the tumor is thought to be from mesodermal cells displaced during embryonic development but retaining the ability to grow and differentiate into various types of tissue related to the definitive kidney. Histologically a variety of forms may be seen. An abundant embryonal type of connective tissue

is predominant but associated irregularly with gland-like tubules or solid cords and strands of epithelial cells. Abortive glomeruli may be seen. Differentiation of the connective tissue-like elements may proceed into striated muscle, smooth muscle, cartilage, or bone of an adult type.

Neuroblastoma, the malignant tumor of the sympathetic nervous system, frequently occurs in childhood. In addition to originating from the medulla of the adrenal gland, neuroblastoma may arise from the superior cervical ganglia retropleurally and retroperitoneally, from the celiac plexus, in paraganglionic tissue adjacent to the adrenal gland, or from the organ of Zuckerkandl. Grossly a neuroblastoma is an encapsulated, soft, grayish-red tumor which microscopically is extremely cellular with small, darkly staining, embryonal cells in sheetlike masses. There is a variable amount of circular grouping of cells, or pseudorosette formation around a fine fibrillar network. The tumor may show a gradation in maturation from the primitive sympathogone to the eventual sympathetic ganglion cell. Farber[5] believed that such gradations are commonly seen, and because of an improved prognosis with cell differentiation, was of the opinion that multiple sections should be examined. According to Farber, this tumor may undergo spontaneous hemorrhage and necrosis and disappear without any treatment other than biopsy, it may undergo spontaneous maturation and become a benign ganglioneuroma, or it may be treated successfully by radiation even after local metastases have occurred.

Soft Tissue Tumors of Mesodermal Origin.—These soft tissue tumors include a large group which often presents difficult problems of diagnosis. These are rapidly growing, highly cellular, undifferentiated, anaplastic sarcomas wherein identification of the cell origin may be impossible. Many are composed of more or less undifferentiated embryonal cells. As a group these tumors have been inadequately studied. Occurrence is usually within the first year or two of life, and the degree of malignancy is high. If the cell of origin is identified, the tumor may be seen to reproduce muscle, fat, connective tissue, synovial tissue, or nerve structures. Malignant melanoma is seldom seen before puberty, and it is said that if the growth is found in infancy and childhood, it tends to be a tumor of low grade malignancy with infrequent metastases.[4] Case reports of malignant melanoma developing in an infant as a result of transplacental transmission are found in the literature. Pigmented nevi are recognized in the skin shortly after birth; many previously existing nevi may become visible at puberty because of increased growth at this later age period.

Malignant Teratomas.—Solid or cystic malignant teratomas may be found in many parts of the body but are encountered commonly in the sacrococcygeal region, mediastinum, testis, ovary, brain, and in the spinal cord. By comparison with adults, children tend less frequently to have teratomas of gonads and more frequently of other sites. Teratoma implies a tumor wherein derivatives of the three germ layers are represented in structures, the appearance of which ranges from an embryonic undifferentiated tissue to a well-differentiated mature adult one. In many tumors there is an admixture of these two extremes. It is felt that the more mature the cells comprising the neoplasm, the less the degree of malignancy.[6] Some of these neoplasms are almost completely composed of undifferentiated cells which grow rapidly and metastasize widely within a few weeks of the appearance of the tumor. Teratomas probably are the result of belated and abnormal proliferation of pluripotential cells misplaced in early embryonic life.

Tumors of Adults.—Certain designated adult tumors begin to be seen especially in the third decade of life. Although it is true that sarcomas are more frequent in young patients, the occasional case of carcinoma may be overlooked because it is not suspected. Carcinomas in young people are not so uncommon as to be medical curiosities.[8] In these young ages, however, growth tends to be more rapid and prognosis less favorable than in the older adult years.

SUMMARY

Consideration is given to general characteristics of malignancies in childhood with differences indicated between the malignant tumors of adults and children. Cohnheim's theory of embryonal rests is usually advanced as the most plausible explanation for tumors, especially in very young ages. A list of tumors of clinical importance with a brief discussion of each category is given.

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CHILDHOOD MALIGNANCIES
III. Surgical Treatment

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SURGICAL removal before metastasis has occurred offers the best method of treatment for the highly malignant tumors of childhood. Any hope of success, therefore, demands early recognition of the danger and prompt, fearless surgical attack.

The distressingly high mortality from these malignancies has led to an almost fatalistic attitude on the part of the laity and among many physicians as well. This concept of inevitable fatality must be altered by education of the public and the profession. Most malignancies are potentially curable in their early stages of development. Recognition in this stage is impossible in many cases, but it is possible in many others and herein lies the great hope for improving the survival rate.

EARLY DETECTION AND TREATMENT

A recent campaign has been conducted by the American Cancer Society and allied organizations in educating the public to recognize early signs of cancer in adults. Such efforts could well be extended to include signs indicating the possibility of malignancy in childhood, which differ in many respects from those in adults. The possibility of cure of malignant disease should be stressed to parents. Even at the risk of arousing unnecessary anxiety, parents should be urged to consult the family doctor for anything more than a transient departure from the state of a child's normal good health.

Harold Dargeon,[3] who has written extensively from his experience at the Memorial Hospital in New York, suggested that a satisfactory cancer detection program for children should include (1) periodic health examinations, (2) excision or biopsy of swellings as indicated, (3) excision of potentially cancerous growths, (4) systematic clinical investigations, and (5) a revision of the attitude toward benign tumors.

The periodic health examination, including a roentgenogram of the chest and complete blood cell count, should be done monthly from birth to 1 year of age, every three months from 1 to 6 years, and every six months thereafter. Any abnormal, nontraumatic swelling or traumatic swelling which is persistent should be excised or subjected to biopsy. Potentially cancerous growths such as melanoma, teratoma, dermoid, and neuroma should be removed surgically. Any undiagnosed disorder of short or long duration should be thoroughly investigated and repeated examinations done if necessary. These disorders include changes in growth of the entire body or individual members and changes in temperature, behavior, intelligence, or disposition. A serious regard should be held for certain benign tumors which may result fatally by virtue of size, rapidity of growth, anatomic location, or interference with function.

If such an ideal and comprehensive scheme should be followed, many malignant tumors could be recognized in time for effective treatment.

Most malignant tumors of childhood are sarcomas and embryomas which metastasize both through the lymphatic system and through the blood stream. Hence success of surgical treatment is dependent on early and complete extirpation, but surgery offers the only hope of cure. Radioactive therapy, so far, has produced palliation only. Radioactive substances and other chemicals in treatment have been disappointing. The scope of surgery therefore must be expanded. This will be possible, first, if lesions appropriate for surgical treatment are recognized early and presented to the surgeon for definitive treatment, often preceded by biopsy for establishment of the diagnosis. Secondly, the surgeon must be prepared to accept his responsibility and to proceed with promptness, skill, and courage to attack problems which often may seem hopeless or impossible. Both courage and strong conviction are needed for a surgeon to advise and then carry out enucleation of an infant's eye for retinoblastoma, amputation of an arm or leg for sarcoma of the bone, or laparotomy for a tremendous mass almost filling the abdominal cavity.

With proper precautions taken, however, children and even infants have an astonishing ability to withstand formidable surgical procedures. Preparation of the ill patient for operation is an obvious necessity. Fluid and electrolyte disturbances must be corrected. Anemia must be treated with blood transfusion and blood made ready for use during the operation. Dependable anesthesia must be available. Careful, painstaking surgical technique must be used to avoid shock and minimize blood loss. A knowledge of anatomy and pathology and sound surgical judgment are

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essential to success. In spite of the grave responsibilities involved and the detailed care required, these operations can and must be done if the appallingly high mortality from childhood malignancy is to be lowered.

AREAS MOST OFTEN AFFECTED

Six main body areas are most often affected by malignancies in children, namely (1) blood and lymphoid system, (2) kidney and adrenal gland, (3) central nervous system, (4) eye, (5) bones, and (6) skin and supportive tissues (table 1).

TABLE 1.—*Incidence of Malignant Tumors Seen at the Children's Medical Center, Dallas.*

Tumor		No. Cases
Kidney and Adrenal Gland		21
Embryoma (Wilms's tumor)	11	
Neuroblastoma	10	
Central Nervous System		23
Brain tumors	21	
Spinal cord tumors	2	
Bone		3
Osteogenic sarcoma of the femur	2	
Chondrosarcoma of the femur	1	
Eye		2
Retinoblastoma	2	
Skin and Supportive Tissues		6
Malignant melanoma	1	
Hemangiosarcoma	2	
Fibrosarcoma	1	
Liposarcoma	1	
Synovial sarcoma	1	
Miscellaneous		11
Lymphosarcoma	3	
Neurogenic sarcoma	2	
Hepatoma	4	
Granuloma cell carcinoma of the ovary	1	
Malignant teratoma	1	
Total		66

Blood and Lymphoid System

In tumors of the blood and lymphoid system are included leukemias and tumors of the lymphogranuloma group, such as Hodgkin's disease and lymphosarcoma. It is well known that surgery has no curative value in these conditions and that other types of treatment are palliative at best.

Kidney and Adrenal Gland

Malignancies of the kidney and adrenal gland, especially Wilms's tumor of the kidney and neuroblastoma of the adrenal gland are the tumors most frequently found in the abdominal cavity.[9]

Wilms's tumor (embryoma of the kidney) presents a most favorable opportunity for surgical cure. It is considered by many a congenital lesion, arising in an embryonic cell rest in one pole of the kidney, expanding slowly and remaining well encapsulated. It compresses the kidney and distorts the calyces but interferes very little with kidney function until an advanced stage. Metastasis eventually occurs through the blood stream to liver, lungs, and bones. The tumor occurs in the first five years of life. The earliest evidence is usually the appearance of a palpable mass in one side of the upper portion of the abdomen or in the flank. The growth is often discovered by the mother in bathing the child, but could easily be felt while still in an early stage of growth by a careful examiner during the course of a routine physical check-up. General malaise and pallor may be present but urologic symptoms are rare. Intravenous pyelography will reveal the characteristic deformity of the kidney pelvis.

Immediate surgical removal of the kidney and tumor offers the best chance of cure. Preoperative irradiation to reduce the size of the tumor and aid in its removal has been recommended but is to be condemned because of the dangerous delay. Unless the tumor is of tremendous size, there is actually little advantage in reducing it, and during the irradiation period of from three to six weeks, metastasis can easily occur. Operation should be done transperitoneally, through a transverse abdominal incision so that the renal vessels can be ligated before the tumor is manipulated. Resection of tumor and kidney is not difficult unless extension to surrounding structures has occurred.

Survival for eighteen months after resection usually establishes a cure. Ladd and Gross[7] in 1941 reported 14 patients surviving eighteen months or more of 54 operated on. Importance of early diagnosis and operation is emphasized by the fact that although the survival rate was 25 per cent for the entire group, it was 50 per cent for those operated on during the first year of life. A later report by Gross on 38 patients undergoing operation at the Boston Children's Hospital between 1940 and 1947 showed a striking improvement in results, apparently in part because of the use of postoperative irradiation. Survival in patients of all ages was 47 per cent, and in patients younger than 1 year, 80 per cent.

Neuroblastoma has its origin in sympathetic nerve elements, usually in the adrenal medulla, but also from lumbar, thoracic, or cervical sympathetic nerves. It is the malignant tumor most frequently occurring in the abdominal cavity and, like Wilms's tumor, is usually discovered by accidental palpation of the mass. Diagnosis can be made only at operation. Although highly malignant and metastasizing early to liver, lungs, and bones, this tumor is also well encapsulated and can be cured by timely surgical removal. The outlook is less favorable than for Wilms's tumor, but many survivals are reported. Postoperative irradiation should always be given over the tumor site and even to known metastases, since this type of growth is radiation-sensitive. After the primary tumor has been removed, metastases treated by irradiation have been known to disappear and the patient to live many years apparently free from tumor.

A rare malignancy is the adrenocortical tumor, liberating androgenic substances and characterized by ac-

celerated puberty in the male and masculinizing features in the female. Early diagnosis and removal of the tumor may be curative. The kidney may sometimes be preserved.

Central Nervous System

The subtentorial areas of the brain are the most frequent sites of tumors of the central nervous system. These cannot always be divided accurately into malignant and benign growths. However, expanding lesions in the cranial cavity are inevitably fatal if not completely removed, regardless of their histologic character. Symptoms are usually those of increased intracranial pressure, seldom with localizing signs. Suggestive symptoms are lethargy and frequent, unexplained gastric upsets. Diagnosis is made by examination of the eye grounds, encephalogram, or ventriculogram. Operative removal of these tumors is the only possible treatment but results have been discouraging. The most optimistic reports give a survival rate of 30 per cent, most of these in cerebellar astrocytomas.[2, 2a]

Eye

Retinoblastoma, almost always observed in the first three years of life, is the most frequent malignant tumor of the eye. It produces dilatation of the pupil, a characteristic color change within the pupil, and visual disturbances. Early enucleation may be curative. Dargeon reported 6 survivals in 9 cases. This tumor may be bilateral.

Bone

Malignant tumors of the bone are predominantly osteogenic sarcomas or endotheliomas (Ewing's tumor) usually affecting the long bones. Pain and disturbed function are the first symptoms. Fever may be present. Visible or palpable swelling is the late manifestation. Pathologic fracture may be the first indication. Roentgenologic studies are usually diagnostic but biopsy may be necessary. Radical surgery, usually amputation, must be recommended, but the prognosis is poor, few survivals being reported.

Osteochondroma, arising from the long bones near the joints, is often multiple and usually benign but may change into the highly malignant form of chondrosarcoma.

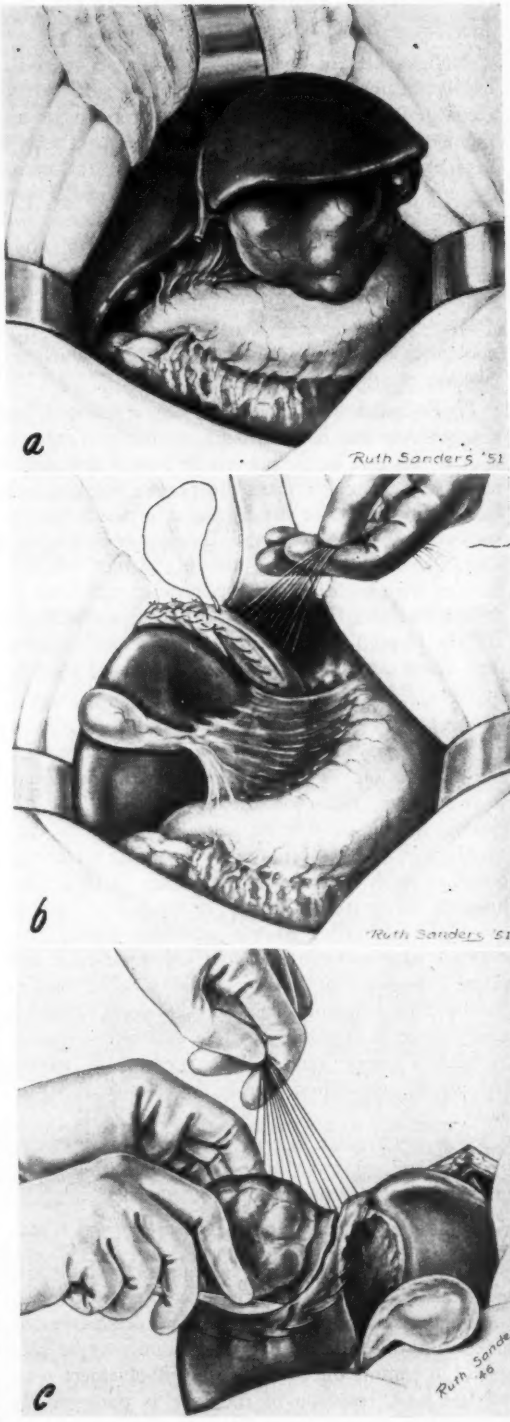

FIG. 1a. Metastatic neuroblastoma of the left lobe of the liver. Palliative resection was done because of obstruction of the stomach by the tumor.

b. Operative procedure for resection of the left lobe of the liver, which is also applicable to the removal of other malignant and benign tumors.

c. Operative procedure for resection of a hepatoma of the right lobe of the liver. The patient was alive and well six years after operation. [After Duckett, J. W., and Montgomery, H. G.: Resection of Primary Liver Tumors, Surgery *21*:455-469 (April) 1947.]

Skin and Supportive Tissues

Malignancies of the skin and supportive tissues usually begin as benign growths. Most are derived from peripheral nerves, such as neurofibromas and pigmented nevi, and from vascular elements such as hemangiomas. About 15 per cent of neurofibromas become malignant neurosarcomas. A smaller percentage of pigmented nevi and hemangiomas will become respectively malignant melanomas and angiosarcomas. Hence it is strongly advisable to eradicate all such potentially dangerous tumors.

Neurofibromas are recognized as small, firm nodules in the skin or subcutaneous tissue which can be easily removed surgically.

Pigmented nevi vary widely in size, appearance, and number. Any may become malignant but such a change is extremely rare before puberty. It may be impractical to remove all nevi if many are present but any with dark pigmentation or any subject to repeated trauma, such as those on the feet, should certainly be removed surgically. The practice of destroying such nevi by dessication with high frequency electric current is to be deplored because of the danger of incomplete removal and the possibility of malignant change due to irritation. Three cases of malignant melanoma are reported by Russo,[8] 1 congenital and 2 in children 3 years of age.

Hemangiomas also vary widely in structure, size, and distribution. The capillary type often is treated successfully with carbon dioxide snow or by irradiation, leaving little or no scar. The cavernous type may be treated by injection with sclerosing substances but is probably best removed surgically or by a combination of methods. Some hemangiomas are so extensive, infiltrating muscle and other tissues, that multiple-stage procedures, using both irradiation and surgery, become necessary. These massive tumors are the most dangerous from the standpoint of malignant change to angiosarcoma. An extremity involved by such a tumor may become functionally useless and require amputation even in the absence of malignancy.

Rarer tumors, such as neuromas, fibromas, myomas, lipomas, and myxomas arise from supportive structures and any may undergo malignant change.

MISCELLANEOUS

Hepatomas (primary liver cell tumors) exhibit low grade malignant tendencies or may become of such enormous size as to cause death from destruction of functioning liver tissue. Early operation may be successful in eliminating this tumor. If involvement is in the left lobe, resection of the lobe is preferred. It is possible to resect a large segment of the right lobe without serious difficulty. One of the 4 patients with hepatoma operated on at the Texas Children's Center in Dallas was alive and well four years after about a fourth of the right lobe was resected. Dorothy Andersen[1] reported only 1 survival in 12 cases.

Teratomas of the sacrococcygeal region contain a variety of tissues derived from all three germinal layers, and in approximately 20 per cent of the cases, carcinoma may be found. Total eradication will involve an extensive operative procedure but is justified by the excellent results obtained as reported by Gross and Neuhauser.[4] Our only patient with malignant teratoma was alive and well three years after a three-stage abdominoperineal resection of the rectum and an enormous tumor containing adenocarcinoma.

Malignancies of the ovary are usually granulosa cell carcinomas and are revealed by signs of precocious puberty, including early menstruation and development of secondary sexual characteristics. Resection of the ovary is usually curative since metastasis is late. Surgical exploration is required to establish the cause of precocious puberty since a tumor may be too small to be identified by abdominal or rectal palpation.

Teratomas or embryomas of the testis are rare but are highly malignant, and few cures are reported.[6] Several malignancies occurring predominantly in adult life may be found in children. Polyps of the rectum and colon are a frequent cause of bleeding in childhood, and occasionally these polyps may early undergo malignant changes. Johnston[5] noted 47 proved cases of carcinoma of the colon in children younger than 6 years of age. The youngest was 3 years. Because of this malignant tendency, which is greatest in multiple polyposis of the colon, and because of hemorrhage, polyps of the colon and rectum should be removed through an endoscope or by abdominal incision and colotomy. Segmental resection or even total colectomy may be necessary when involvement is extensive.

SUMMARY

Surgical removal before metastasis is the best treatment for the highly malignant tumors of childhood; therefore, early recognition is essential. A satisfactory cancer detection program for children should include periodic health examinations, excision or biopsy of swellings, excision of potentially cancerous growths, systematic clinical investigations, and a revision of the physician's attitude toward benign tumors.

Surgery in tumors of the blood and lymphoid system, including leukemias, Hodgkin's disease, and lymphosarcoma, has no curative value and other types of treatment are only palliative. Wilms's tumor and neuroblastoma, treated with surgery and postoperative irradiation, offer favorable opportunity for cure, although the outlook in the latter condition is less

favorable. Operative removal of tumors of the central nervous system is the only possible treatment; however, results have been discouraging.

In retinoblastoma, enucleation of the affected eye may be curative. Radical surgery, usually amputation, is necessary for malignant tumors of the bone, but few survivals are reported.

Neurofibromas, pigmented nevi, and hemangiomas should be eradicated with surgery or irradiation or a combination of methods if they seem to be potentially dangerous. In hepatomas, resection of the left lobe of the liver is possible. Total eradication of teratomas is justified by excellent results.

Resection of the ovary in malignancies of the ovary is usually curative; however, few cures are reported from the highly malignant teratomas or embryomas of the testis.

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Box 28.

CHILDHOOD MALIGNANCIES

IV. Roentgen-Ray Diagnosis and Treatment

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MALIGNANT neoplasms in childhood are observed relatively often, especially if one has an interest in both diagnosis and therapy of such conditions. The radiologist, being interested in both aspects of the problem, might even consider such neoplasms common. The radiologist at a children's medical center of necessity would have an abnormal idea concerning the frequency of malignant neoplasm. It should be obvious that statistics are of little moment, since they vary greatly depending on the interests and opportunities of the physician reporting them.

As a cause of death malignant neoplasm becomes important. If rheumatic fever is excluded, more children die of malignant neoplasm than of several of the next most common infections causing death including poliomyelitis.

Regardless of statistics, certain tumors are relatively common in childhood. It is obvious that this discussion can give only a brief report of the most common malignant neoplasms of childhood. Four groups of tumors will be discussed, namely, malignant lymphomas, brain tumors, abdominal tumors, and malignant growths of bone.

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Read before the Section on Pediatrics, Texas Medical Association, Annual Session, Dallas, May 7, 1952.

An abstract of the discussion of this paper follows the fifth paper of the symposium.

MALIGNANT LYMPHOMAS

Malignant lymphomas are malignant neoplasms. While there are those who may question this statement, until more information is available it is my impression that these lesions should be considered malignant as should the leukemias. If these statements are accepted, then malignant lymphomas cause more deaths than any other group of neoplasms under discussion.

Leukemia is the malignant lymphoma most frequently seen. The roentgenographic manifestations of leukemia are not too important; the most frequent manifestation of any significance is the destruction of bone which is occasionally seen. Sometimes an enlargement of the spleen which might escape the attention of the clinician can be ascertained by the roentgenologic examination. Certainly on rare occasions enlargements of the hilar and upper mediastinal lymph nodes might be seen as the result of leukemia although this is not a common manifestation. There are those who discuss leukemic infiltrations in the lungs; however, this observation is certainly open to question. I have seen patients with mottled infiltrations of the lungs but these lesions have not been proved to be leukemic.

It is an exceptional patient in the pediatric age who will be considered to have Hodgkin's disease. On the other hand lymphosarcoma is seen not in-

frequently. Here again the bone lesions are important and in fact may be indistinguishable from the metastasis of neuroblastoma. Again, the hilar and upper mediastinal lymph nodes may be enlarged as the result of either Hodgkin's disease or lymphosarcoma.

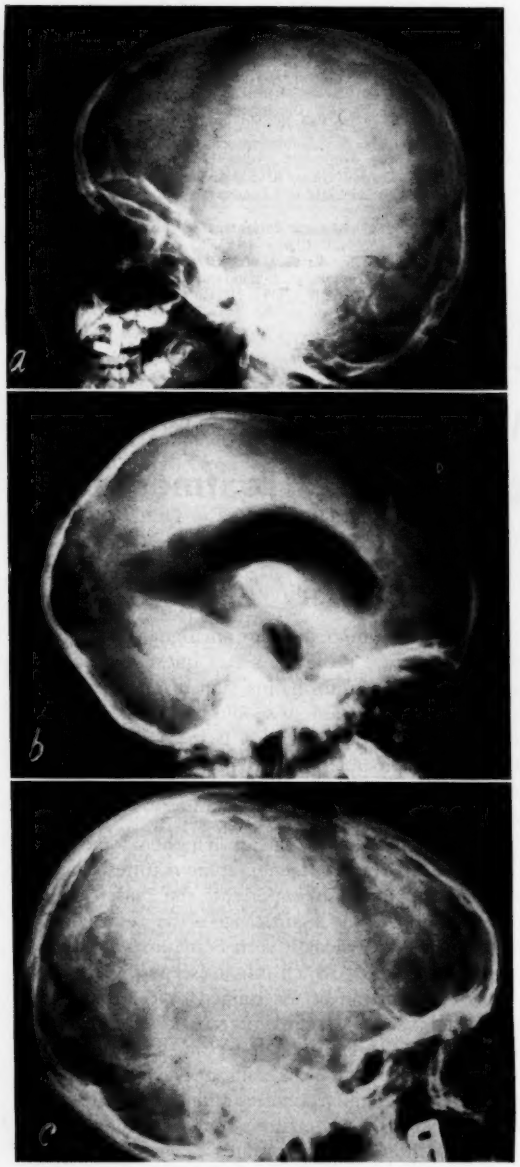

FIG. 1. Roentgenograms of the skull showing types of brain tumors.
a. Cerebellar astrocytoma. A lateral view shows definite separation of a coronal suture because of increased intracranial pressure. Stippled calcification in the posterior fossa may be noted.
b. Medulloblastoma. A large tumor of the posterior fossa projects into the fourth ventricle.
c. Craniopharyngioma. Calcification above the sella turcica is apparent.

BRAIN TUMORS

Neoplasms within the cranial vault are a significant number of the total neoplasms that occur in children. Although all are not malignant in the strict sense that they may invade other tissues and spread to other parts of the body, they are malignant in the sense that they are capable of producing death because of their position. Although various types of intracranial neoplasms which occur in adults may be seen in children, three types stand out: medulloblastomas, cerebellar astrocytomas, and craniopharyngiomas.

Children who have persistent headaches should be suspected of having brain tumor. Certainly if there is any nausea or vomiting this diagnosis becomes even more of a possibility. If to these symptoms ataxia is added, intracranial neoplasms is almost certain. A rather striking percentage of neoplasms within the cranial vault in children can be detected by plain films because of calcium contained in these lesions, especially in craniopharyngiomas and cerebellar astrocytomas. The most common roentgenographic finding, however, is separation of the sutures, which, of course, indicates increased intracranial pressure. Two other roentgenologic signs of increased intracranial pressure, namely, erosion or demineralization of the dorsum sellae and disproportionate in-

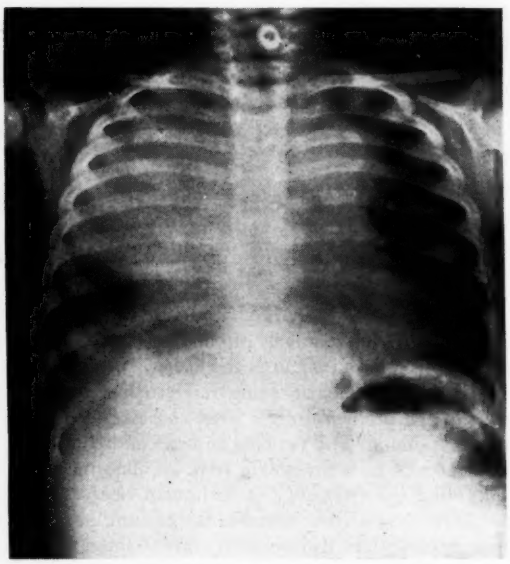

FIG. 2. A roentgenogram showing extensive metastasis from Wilms's tumor involving almost the entire field of the right lung with some metastasis in the left lung and also in the mediastinum. Such widespread metastasis is seen occasionally in a Wilms's tumor even with a careful follow-up, since these tumors may grow rapidly.

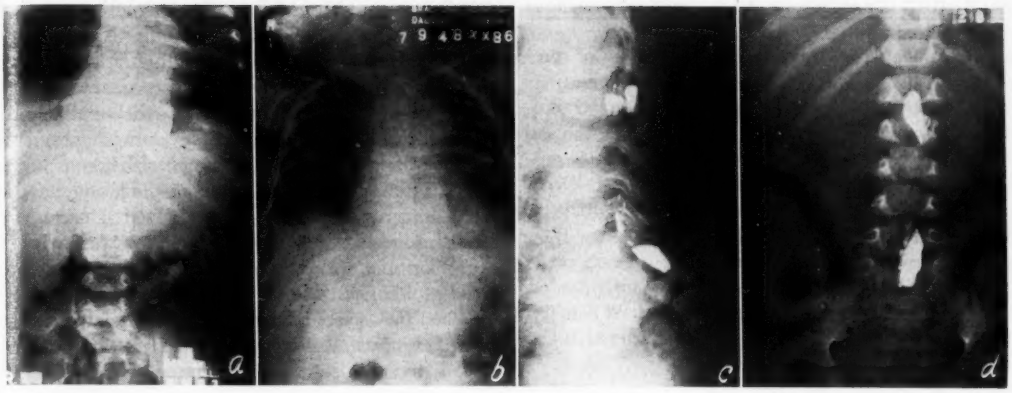

FIG. 3. Roentgenograms showing examples of neuroblastoma.

a. The left kidney is displaced downward by a suprarenal neuroblastoma which can be recognized as extrarenal and which has some stippled calcification; this type of calcification occurs in neuroblastomas and not in Wilms's tumor. Extensive neoplasm extends through the diaphragm into the mediastinum.

b. The view of the chest of the patient in *a* shows the double shadow of the cardiac silhouette and extensive mediastinal metastases. The liver also is large and filled with neoplasm.

c and d. Lateral and anteroposterior views of a neuroblastoma within the vertebral canal of the lumbar region; the increase in size of the canal is apparent in both projections. Both ends of the long neoplasm are visualized by the radiopaque contrast material. The patient responded well to irradiation therapy and was able to walk and was doing well three years later.

crease in the convolutional markings, are practically never seen in children. A physician who does not see a great number of roentgenograms of children's skulls may be misled into believing that pressure is increased when the convolutional markings in reality are normal.

Most tumors seen in children are in the posterior fossa. It is exceptional to see calcium in the posterior fossa and its presence practically always indicates a cerebellar astrocytoma. Tumors of the posterior fossa obstruct the flow of the cerebrospinal fluid and cause an increase in intracranial pressure, manifest roentgenologically as a separation of the sutures (fig. 1a).

Pneumoencephalograms usually show considerable dilatation of the lateral and third ventricles. On occasion the cerebral aqueduct and the upper portion of the fourth ventricle can be visualized and the tumor may be seen pressing into the fourth ventricle from behind or from one side or the other (fig. 1b). The medulloblastoma is the most common tumor in the posterior fossa seen by radiologists; the reason is that the tumor is radiosensitive and irradiation is used for treatment.

Most of the time the indication of a tumor of the posterior fossa is indirect. Using indirect evidence occasionally leads to error since obstructive congenital malformations, inflammatory lesions, and even subdural hematomas may produce the same pressure

FIG. 4. Roentgenograms of osteogenic tumors.

a and b. Anteroposterior and lateral views of a chondrosarcoma involving the proximal end of the fibula with considerable new bone formation.

c and d. Anteroposterior and lateral views of an osteogenic sarcoma of the distal end of the femur with vertical spicules of bone extending from the very dense bone of the shaft; this is a frequent appearance of the osteoblastic type of sarcoma.

changes as neoplasms which obstruct the flow of cerebrospinal fluid.

The most helpful roentgenologic sign of craniopharyngioma is the calcium above the sella turcica. It may vary in appearance but most frequently is represented by numerous flakes of calcification. Occasionally a curvilinear calcific shadow which may be mistaken for calcification within an aneurysm will be seen in the wall of the cyst. It is only on rare occasions that the clinoid processes are significantly eroded or that the dorsum sellae is demineralized. When the tumor has become large, however, these latter changes in the bone occur (fig. 1c).

ABDOMINAL TUMORS

An abdominal tumor is a common presenting sign of malignant neoplasm. Various lesions producing abdominal masses in infants, such as hydronephrosis or a cyst of the kidney, show similar signs; however,

FIG. 5. A roentgenogram of the femur showing evidence of bone destruction as well as a soft tissue tumor containing spicules of bone. On biopsy it was proved to be a Ewing's tumor, which responded well to irradiation.

most of the tumors seen in early childhood are Wilms's tumor (fig. 2) or neuroblastoma (fig. 3). Many writers, including Caffey and Wyatt, indicate that neuroblastoma is the most common neoplasm of the abdomen during infancy and childhood. It has been my experience that Wilms's tumor is more common than neuroblastoma; in fact this ratio has been about two Wilms's tumors for every neuroblastoma. These tumors cannot be conclusively differentiated by the roentgenographic findings; even with urograms they may appear similar. Most neuroblastomas begin in the adrenal gland, and although diagnosis may be difficult, usually they can be recognized as extrarenal tumors. One extrarenal Wilms's tumor was called a neuroblastoma erroneously because it could be recognized as being outside the kidney.

When metastases have occurred, it is relatively easy to differentiate Wilms's tumor and neuroblastoma. This differentiation is of little importance insofar as the patient is concerned, however, since in general both are incurable at this time. Metastases of neuroblastoma usually are found in the liver and within the skull. The bone metastases cannot be differentiated from the changes seen in leukemia and, on occasion, in lymphosarcoma. Cranial involvement is less common in leukemia and is certainly not as extensive as is sometimes seen in neuroblastoma. I have not seen a Wilms's tumor metastasize to bone. The common metastasis from this growth is the typical venous metastasis within the lungs.

Although the urogram is frequently helpful in differentiating neuroblastoma and Wilms's tumor, it is not absolute. When there is displacement of the pelvis, the infundibula, or calyces by a tumor which appears to be within the kidney itself, the lesion is more likely to be a Wilms's tumor. These structures are frequently elongated and stretched into a pattern which might be expected in a polycystic kidney. In the instance of Wilms's tumor, however, there would appear to be a single, large, unilateral mass, whereas polycystic disease is nearly always bilateral. Single cysts are difficult to differentiate from Wilms's tumor.

Irradiation therapy is important in the treatment of both of these common malignant neoplasms of the abdomen in children. In my experience it is much more important in the therapy of Wilms's tumor, which practically always responds well to irradiation. There is considerable controversy as to the exact technique of administering the irradiation. With some reports from the large medical centers there is even some question as to whether irradiation therapy should be given. Although this may be true in these large centers, there is no question in my mind that irradiation therapy should be used on the average patient obtaining the usual surgical therapy obtainable in the United States. Certainly Wilms's tumor is one neoplasm in which external irradiation can entirely destroy the tumor. Irradiation also may destroy neuroblastoma, but a certain number actually may be classified as radioresistant. The therapy of neuroblastoma is not nearly so satisfying as is that of Wilms's tumor.

BONE MALIGNANCIES

Primary chondrosarcomas (fig. 4a and b) and osteogenic sarcomas (fig. 4c and d) are the two important malignant osteogenic tumors. Ewing's tumor (fig. 5) is the most important example of the malignant nonosteogenic tumors. Leukemia also may be considered in this category; however, it is discussed elsewhere. Myeloma is not an important consideration since it either is rare or probably does not occur before puberty. However, I have seen 1 case of multiple myeloma in a 13 year old person, proved at postmortem examination, in which the roentgen-ray findings were certainly those of multiple myeloma rather than some other malignant neoplasm.

Osteogenic sarcomas are seen with two rather widely varying types of roentgenographic manifestation. Those which are osteolytic present themselves as destructive lesions of the bone. The osteoblastic types, on the other hand, are bone producing and are striking in appearance. Although the vertical spicules of bone are more frequently seen in the osteoblastic type of osteogenic sarcoma, this type of change also may be seen in Ewing's tumor. The differentiation roentgenologically, therefore, cannot always be made. While the ends of the shafts of the femur, humerus, and tibia are most commonly involved, osteogenic sarcomas may occur in any of the bones of the skeleton.

In general osteogenic tumors and their metastases are radioresistant and irradiation affects them little, if at all. Sometimes chondrosarcomas may be seen to retrogress to some extent with irradiation therapy. They also, however, must be classified as radioresistant tumors.

Despite the excellent response of Ewing's tumor to irradiation, only an exceptional patient survives five years.

CONCLUSIONS

Malignant neoplasms are more common in children than generally supposed.

The common neoplasms seen in children logically fall into four groups, namely, malignant lymphomas, intracranial neoplasms, abdominal tumors, and primary malignant tumors of the bone. Other malignant neoplasms are relatively rare and may not be seen in the course of a pediatric or general practice. The radiologist may assist both in the diagnosis and in the therapy of the tumors of childhood.

CHILDHOOD MALIGNANCIES
V. Chemotherapy of Leukemia

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THE attitude of most physicians toward the value of chemotherapy of cancer in childhood, and more particularly leukemia, has become progressively more pessimistic. There is some justification for such a viewpoint since the evidence to date has indicated that only a temporary remission may be hoped for. Nevertheless, if continued progress is to be made, emphasis should be placed on the need for renewed clinical investigative efforts.

The chemical control of cancer is not a recent development, for arsenic was used as early as 1865 and benzol in 1905. Radioactive isotopes were tried and still are used in some chronic neoplasms. The nitrogen mustards, outgrowths of a form of chemical warfare, are effective against Hodgkin's disease, some forms of lymphosarcoma, and chronic leukemia. Subsequently urethane was observed to be of some benefit in chronic forms of leukemia. A number of other chemical compounds have been used in cancer experimentally produced; however, the most promising group is exemplified by the folic acid antagonists. They represent compounds that influence a specific mechanism in cell metabolism.[5]

In the appraisal of the various types of chemotherapy, leukemia, because of the relative facility in estimating quantitative changes, has been the neoplastic disease most intensively investigated clinically. This is also true to some extent in the field of experimental cancer. Consequently, the bulk of this discussion will be concerned with leukemia in children.

LEUKEMIA AND ITS COURSE

The common form of leukemia seen in children is usually designated as acute leukemia and characteristically is manifested by leukopenia in the peripheral blood with an overwhelming growth of undifferentiated neoplastic cells in the bone marrow. The untreated disease has a natural course that is fairly rapid, death occurring on the average from two to five months after onset. The clinical manifestations observed in 37 cases are shown in table 1. Such a disease as leukemia lends itself to more dramatic changes

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than other types of less rapidly growing neoplasms.

There have been numerous examples of the striking changes in the bone marrow of patients treated with antifolic acid drugs. There can be no doubt about the change from a frankly leukemic marrow to one in which the presence of leukemia is noted with difficulty. This pattern of response when first encountered in 1948 was striking and offered hope that a way to combat leukemia had presented itself. With continued efforts it was soon obvious that this hope was not to be realized. Table 2 shows the results in 34 cases of leukemia observed at the University of Michigan and treated for at least three weeks with Aminopterin, a folic acid antagonist. A 65 per cent rate of remission, 6.5 times greater than the rate known to occur in the course of the untreated disease, was obtained.

TABLE 1.—*Symptoms and Signs Noted in 37 Cases of Acute Leukemia.*

Symptom or Sign	Cases No.	Cases %
Pallor and anemia	32	87
Splenomegaly	30	81
Malaise, weakness, and fatigue	29	79
Lymphadenopathy	28	76
Hepatomegaly	25	68
Fever	17	46
Anorexia	17	46
Petechiae, ecchymoses	16	43
Infection of the upper part of the respiratory tract	14	38
Epistaxis	12	33
Bone pain, extremities	12	33
Bleeding (other than skin or nose)	9	24
Joint pain	8	22
Loss of weight	6	16
Lesions of the mouth	6	16
Shortness of breath	5	13
Nausea and vomiting	5	13
Tumor (usually subcutaneous)	4	11
Abdominal pain	4	11
Headache	4	11
Edema (localized)	3	8
Rash	3	8
Melena	2	5
Enlarged tonsils	2	5
Swelling of the salivary gland	2	5
Tinnitus	2	5
Diarrhea	1	3

Remissions during the untreated disease are associated commonly with severe infection.[6] The liberal use of antibiotic drugs in severe infections that might have resulted in death may result in remissions and may influence favorably the remission rate in leukemia. In the series presented here none of the patients had severe infections; nevertheless this aspect of the disease should be kept in mind when evaluating results of any type of therapy. The drug-induced remissions unfortunately are not maintained. This can be seen in table 3, in which the average length of life with treatment and the development of remission was thirty-three weeks and the average for an untreated control group was nine weeks. In this instance treatment prolonged the average life twenty-four weeks. These figures represent the best results. When the data are analyzed in crude form, the differences are not so striking; the amount of benefit achieved under these circumstances is the basis for the pessimism previously mentioned. However, the results also indicate that some progress has been made. The demonstration of arrest of the disease in acute leukemia for periods as long as three years is proof enough that the folic acid antagonists have a place in the treatment of this disease. Furthermore, there is no doubt that some of the distressing symptoms of leukemia are relieved. The prompt disappearance of bone pain and the melting of enlarged lymph nodes and tumor processes are commonly seen with treatment. In addition, reports by others have indicated that similar decreases in the size of solid types of malignant tumors including sarcomas and various forms of carcinoma have been observed. Of 93 such patients treated with folic acid antagonists 23 showed objective improvement.[12]

TABLE 2.—*Incidence of Remissions in 34 Adequately Treated Patients with Leukemia.*

Remissions	Patients	%
Hematologic	22	65
Clinical	5	15
None	7	20

FOLIC ACID ANTAGONISTS

The term folic acid antagonist has been used a number of times without referring to the mode of action of these compounds. The discovery of folic acid and its subsequent synthesis opened the way for investigation of this whole aspect of cellular metabolism. It was subsequently shown that folic acid was converted to the citrovorum factor.[9, 11] This latter substance is present in leukemia cells in increased amounts.[1] Evidence has been presented to show that vitamin C, possibly acting as a coenzyme in tyrosine oxidation,[10] helps in this conversion. The citrovorum factor in turn acts as a coenzyme in the formation of intermediate compounds in the in vivo synthesis of ribonucleic acid, desoxyribonucleic acid, thymidylic acid, serine, and possibly choline and methionine. These compounds are then incorporated into the nucleoproteins essential for cell growth.[11] This schematic explanation of the action of folic acid is not meant to be taken as accomplished facts, but only as a guide to a better understanding of the mechanism.

TABLE 3.—*Effect of Folic Acid Antagonists on Survival Time of Patients with Leukemia.*

	Patients	Length of Life (Weeks) Average	Longest	Shortest
Treated group	34	19.2	140	3
With remission	27	32.9	140	7
Without remission	7	5.6	11	3
Untreated group	23	9.0	28	1

Figure 1 shows the chemical formulas of folic acid and Aminopterin. The latter drug is only an example

of a number of compounds that antagonize folic acid in a similar manner. The slight difference in chemical configuration allows for the substitution of the antagonist in the folic acid metabolic cycle. After substitution has taken place, the metabolic cycle is disturbed and the production of nucleoprotein is distorted, resulting in cell death. This effect has been observed in normal tissues. However, in leukemia, since the neoplastic cells are known to metabolize faster than normal cells, it has been assumed that derangement of nucleoprotein synthesis in the leukemic cells will precede normal cell destruction; this theory is schematically shown in figure 2. Unfortunately this simple concept is not entirely true, for some damage to normal tissue goes hand in hand with the damage to the rapidly growing malignant cells.

Usually the commonest sign of the effect of a folic acid antagonist on normal tissue is the development

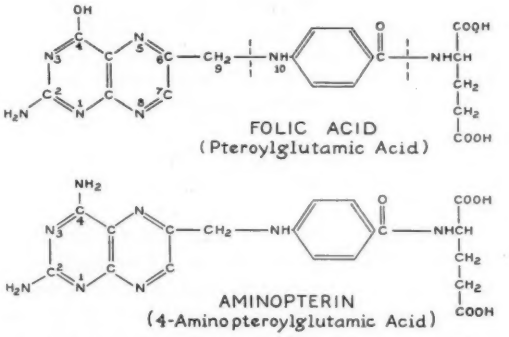

FIG. 1. Diagram comparing the chemical structures of folic acid and Aminopterin.

of lesions in the mouth. Other effects noted are anorexia, nausea and vomiting, abdominal distention, diarrhea, and bloody stools. The latter are severe signs and should be indications for stopping the drug and instituting replacement therapy. Anal lesions are also seen, as are skin rashes and alopecia. The effect on the bone marrow is hypoplasia. Development of vascular purpura is difficult to evaluate. The problem of differentiating the effects of the leukemic process from those of the drug is hard in attempting to decide which is more important as a contributor to hemorrhage; however, the disease is more likely to cause hemorrhage. The harmful effects of the drug undoubtedly have contributed to some deaths, encountered during early experiences with the antifolic acid compounds. In the hands of competent physicians, treatment need not result in death now.

With the development of the citrovorum factor the toxic effects of the antagonists can be overcome, in fact, completely reversed. Furthermore, experimental evidence exists to show that desoxyribonucleic acid or vitamin B_{12} will partially reverse the effects of the folic acid antagonists, as will folic acid itself.[11] As much as forty times the maximal toxic dose of Aminopterin has been given to patients who were receiving citrovorum, and no harmful effects were noted.

Although the citrovorum factor can be used to minimize the harmful side effects of the antagonists, thus increasing their utility,[2] their usefulness is limited because under the best conditions of treatment the neoplastic cells ultimately become resistant to the folic acid antagonists.[2, 3, 7] Surprisingly this resistance has not been demonstrated to occur with normal cells and represents a sharp difference between normal and leukemic cells.[2] The leukemic cells either have the potential ability of ultimately assimilating the antagonists as folic acid or are capable of by-passing the metabolic system involving folic acid. Furthermore, once resistant cells have developed, this resistance is fixed, indicating a probable genetic factor. The assumption is that a heterogenous cell type is present in the parent leukemia and that with continued growth of the tumor in the presence of folic acid antagonists, the susceptible cell types are destroyed, allowing only the resistant forms to grow.

On the basis of these observations it is tempting to speculate concerning the etiologic aspects of leukemia.

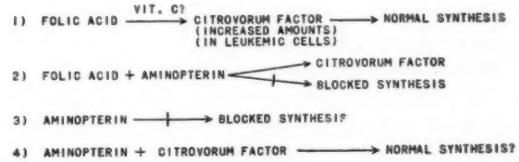

FIG. 2. Schematic diagram of the action of Aminopterin.

It is difficult to ignore the analogy between heterogenous populations of neoplastic cells and heterogeneity as seen in bacterial and viral populations. Added to this observation are the facts that more and more cancers in animals are caused by viruses and that viruses produce acute disease in young animals and chronic neoplastic disease in adult animals.[4]

The leukemic cells which become resistant to folic acid antagonists fortunately are not resistant to the steroid hormones, for ACTH and cortisone are capable of producing remissions in leukemia. The mode of action of these pharmaceutic agents is probably different from that of the antifolic acid drugs. In addition to the fact that cross-resistance to folic acid antagonists and steroid hormones does not occur, the usual sequence of events in leukemia treated with the two types of agents is different. With antifolic acid drugs there is a gradual disappearance of abnormal cells from the bone marrow, a subsequent aplasia of the

marrow, and then the appearance of normal elements, whereas with the steroid hormones the aplastic stage does not commonly manifest itself.[8]

TREATMENT

From the previous discussion it is possible to formulate plans for treatment of acute leukemia. With severe fulminating cases of the disease it seems best to initiate therapy with ACTH or cortisone since the response is usually more rapid than with the antifolic acid drugs. ACTH has been given in doses from 50 to 100 mg. per day and cortisone from 100 to 400 mg. per day. Therapy should be continued until either a remission develops or it is apparent that the leukemic process is progressing unchecked. Usually patients who respond will show an increase in appetite and well being within one week, and improvement in the appearance of the bone marrow will be noted from two to six weeks after therapy has been started. During steroid hormone therapy a low salt diet should be given and also careful watch should be made for changes in blood pressure or weight, as well as the occurrence of abdominal distention and lethargy due to potassium deficit. The difficulty in recognizing infections during steroid hormone therapy also should be realized. Furthermore, the possibility of gastrointestinal hemorrhage from steroid hormone therapy should be recognized. Once a remission has been established, hormone therapy should be stopped.

In patients in whom the disease is not progressing so rapidly, treatment may be initiated with Aminopterin, 0.5 mg. per day by the oral route to children younger than 2 years of age and 1.0 mg. to older children. Some investigators prefer another antagonist, Amethopterin, from 5 to 15 mg. per day. If toxic signs develop, the dosage may be decreased; if severe toxicity occurs, the drug should be stopped and 3 mg. of the citrovorum factor given daily for three or four days. Remissions usually begin with a rather startling increase in appetite and other signs of well being. The bone marrow may approach normal in as short a period as two weeks or may take as long as twelve weeks. Most remissions will be apparent within one month. Furthermore, patients treated with the folic acid antagonists usually have longer remissions than those treated with ACTH or cortisone.[7]

Once resistance has developed to the antifolic acid compounds, the steroid hormones can be used, or in the reverse situation the antifolic acid compounds can be used. With such a plan it is possible to prolong the life of approximately 50 per cent of patients with acute leukemia. Such findings should dissipate some of the gloom surrounding the chemotherapy of leukemia.

CONCLUSIONS

It should be emphasized that the antifolic acid compounds are only a small fraction of chemicals presently available for interfering with cellular metabolism. A large number of other types of antimetabolites, influencing other parts of normal cellular reaction, are available. A questionnaire sent to members of the American Association for Cancer Research showed that present trends in cancer research placed chemotherapy first in importance by a wide margin.[4] The same questionnaire listed advances in the study of metabolic antagonists as being one of the chief advancements in the field of cancer since 1938. Such antagonists have considerably more application to growth of normal cells than to inhibition of growth of neoplastic cells. Using antagonists of substances known to be necessary for cell growth, a large amount of information has been obtained about the mechanisms of cellular metabolism.

The intensive efforts being directed toward the chemotherapy of experimentally produced neoplasms has been responsible for most of the advances made in the clinical field. At the same time there are limitations to the experimental observations that can be overcome only by clinical investigation. If the accomplishments that have been made in the past continue at the present rapid rate, the possibility of chemical control of some neoplastic diseases does not seem so remote.

Chemotherapy offers the most hopeful outlook in the control of neoplastic disease. An example is the use of folic acid antagonists, notably Aminopterin, in the treatment of leukemia in children, which not only arrests the disease for appreciable periods but also relieves some of the most distressing symptoms. Folic acid antagonists react on normal tissue as well as on cancerous growths, and the citrovorum factor may be administered advantageously to reduce the unpleasant side effects. Resistance to antifolic acid drugs occurs in leukemic cells and apparently is nonreversible. When resistance develops, the steroid hormones ACTH and cortisone afford an alternate treatment of the disease.

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ABSTRACT OF DISCUSSION

DR. MILDRED STANLEY, Tyler: The members of this symposium have presented in an excellent way important and distressing pediatric problems. I cannot add anything original to their discussions but would like to stress certain practical points which might be of help to pediatricians.

Early recognition of malignancy is the only chance for reducing the death rate from this disease. Of course, in the strictest sense, there is no such thing as early diagnosis of childhood cancer, for even if a diagnosis can be made soon after onset of symptoms, the life of the tumor may precede the diagnosis by months or even years. If the parents could be taught to watch for certain symptoms, perhaps cases might be discovered earlier for treatment; however, in general there are no characteristic clinicopathologic findings that aid in the recognition of malignant tumors in early life. Symptoms other than those produced by interference in the immediate neighborhood of the tumor are rare in early life; pain is usually lacking until after a mass becomes apparent. Pallor, loss of appetite, fever, loss of weight, constipation, dyspnea, dysuria, vomiting, and irritability may be noted, depending on the location and behavior of the tumor, but such findings are not constant and may be observed in many illnesses of childhood.

The symptoms are multiple and varied as would be expected from a disease which affects so many different parts of the body. Yet the objective and subjective signs of all these neoplasms may be briefly summarized as (1) the unusual child and (2) the atypical case. The child who shows significant differences physically or mentally from his fellows may have cancer; the child whose history is that of a changed person in that the present disorder has produced noticeable deviation from his usual mental or physical state may have cancer. The child who has a disease which appears to be diagnosed correctly at first but then runs an atypical course especially of a chronic nature or with recurrences may have a malignancy.

The only means of finding malignancy early is the careful, complete periodic check-up. As has been emphasized, a Wilms's tumor which is discovered by the doctor in routine physical examination has a much greater possibility of cure than one noticed only after the mother has detected a mass or noted the enlargement of the abdomen. An unfortunate situation exists in the ages from 1 to 4 years. In this group malignant tumors which are known to be curable in some instances, such as retinoblastoma, Wilms's tumor, and some somatic sarcomas, seem to occur more often than at other ages. In addition, a number of benign tumors such as hemangiomas, lymphangiomas, ganglioneuromas, and neurofibromas which are potentially fatal are seen before the fifth year. Yet this pre-school group is not as well supervised medically as is the infant in his first year or the school child from 6 years onward. Thus, at an age in which cancers with a not universally unfavorable outlook occur, the unrecognized disease progresses because of lack of examinations.

From the papers in this symposium it is evident that malignant tumors are seen infrequently in private practice or even in general hospitals, but the high cancer death rate places it in a conspicuous position among the causes of childhood mortality. It is not so much the frequency that is important but the risk involved if the disease is overlooked.

Some generalizations in attempts to diagnose neoplastic disease in a child can be made:

1. The common cancers of the adult, namely, those of the mouth, stomach, intestine, prostate, breast, and female genitalia do not usually enter into the problem.

2. The cancers of children, with the exception of those of the central nervous system and some lymphomas, are readily accessible to examination; thus the diagnosis may be made frequently on physical examination alone. As Farber has emphasized, the single most important sign and often the only indication of the presence of a malignant tumor is the finding of an unexplained solid mass.

3. This accessibility of tumors also increases the feasibility of therapy.

Although research probably will give the final answer in this problem, certain policies if adopted would be of great benefit in helping to conquer cancer:

From the layman's standpoint three points are important: (1) The public should know that cancer constitutes a real hazard during childhood. (2) The importance of continuing periodic medical examination of the child not only during but after infancy cannot be overemphasized. (3) Cancer should be made a reportable disease.

From the physician's standpoint two items need consideration: (1) A revision in the approach to the differential diagnosis of swellings, obscure symptoms, and physical and psychologic peculiarities seems indicated. Neoplasms should occupy a primary position in the consideration of any of these conditions. (2) The necessity of a prompt and thorough investigation of any suspicious mass or symptom-complex is evident.

Thus the cooperation of the parent, physician, surgeon, pathologist, roentgenologist, radiologist, and health officer is necessary in each case of childhood malignancy if unnecessary deaths from this group of diseases are to be prevented.*†

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In 1948 a poll of high school students by the Purdue University Opinion Poll revealed that 80 per cent of those polled favored socialized medicine. In 1950, the last year the question was asked, the poll showed that the percentage of students favoring socialized medicine had been reduced to 55 per cent.—A.A.P.S. News Letter, July, 1952.

FLUID AND ELECTROLYTE IMBALANCE

Limitations of Plasma Sodium Levels as a Measurement of Dehydration

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ALTHOUGH the condition of body fluid deficit, known as dehydration, has been appreciated for many years as one of the most frequently occurring syndromes in clinical medicine, it still remains a highly perplexing diagnostic problem. Many diverse opinions exist relative to the clinical and laboratory findings that are associated with the dehydrated state. For example, it has long been known that in the absence of water intake for twenty-four hours or more, a state of dehydration of the body developed which was axiomatically associated with thirst and oliguria; and it was exceedingly distressing to learn through more recent knowledge that dehydration also can be severe in the absence of both thirst and oliguria.

It is the purpose of this paper to review the physiology of the kidney as it pertains to fluid balance and to delineate the pathogenesis of the two classical forms of dehydration. From these concepts it will become apparent that serious dehydration states frequently occur in the absence of all the findings commonly accepted as diagnostic of dehydration.

The confusion existing in the literature, and consequently in the minds of practicing physicians, concerning the signs and symptoms of dehydration developed largely because early investigators believed that a single syndrome was involved. Only in recent years has it been appreciated that dehydration was not a clinical entity, but rather a finding that was common to two syndromes which were dissimilar in all other characteristics.

The choice of the term dehydration was exceedingly unfortunate since it incorrectly implies a single syndrome. As a result, it becomes disturbing to observe diametrically opposed findings in 2 patients both of whom are "dehydrated."

The normal kidney has two primary functions aside from the elimination of waste products, both of which are paramount in the preservation of the organism. The conservation of water and the maintenance of isotonicity of the extracellular fluid are functions which the kidney strives to achieve at all times. While physicians are familiar with these functions of the kidney, a point frequently overlooked is that the accomplishment of one of these functions in a situation of stress often requires the sacrificing of the second function.

An example of this situation may be seen in a vomiting patient treated with salt free fluids. Such a patient is more deficient in solutes than water, thereby producing a hypotonicity of the extracellular fluid. The only possible means by which the kidney can correct the undesirable hypotonic state of the blood is to eliminate the water that is present in relative excess. The fact that the "excess" water is only excessive in relationship to the more deficient quantity of solute is not discernible to the kidney. Actually the total body waters are also deficient, and elimination of the "excess" water only further dehydrates the organism. This dehydration of the body stimulates the antidiuretic mechanisms, principally by way of the posterior lobe of the pituitary body and the kidney is then hormonally prevailed upon to decrease the output of water. It is obvious that both functions cannot be accomplished simultaneously, since one function requires the elimination of water and the second its retention. Such situations are solved by the kidney by partial accomplishment of each function and complete fulfillment of neither. Of the two functions the kidney favors the maintenance of isotonicity. This favoritism may be sufficiently great to result in the destruction of the organism through vasomotor collapse due to the drastically reduced blood volume.

An understanding of the conflicting functions of the kidney and the preferential responses made, together with an appreciation of the osmotic flow of the fluids between compartments, enables one to visualize the responses made by the body to deficits of either water, solute, or both.

PURE WATER DEPLETION

The daily fluid turnover in an average adult is about 2,600 ml. Of this amount 1,500 ml. is ingested as drink and 1,100 ml. as food. The fluid output amounts to 1,500 ml. as urine, 100 ml. as feces, and 1,000 ml. as insensible perspiration. The quantity of fluid ingested daily, and subsequently eliminated, can vary over wide ranges without altering the total body water provided only that it does not fall below the

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critical minimum of approximately 1,500 ml. Intake of less than that amount rapidly produces water depletion of the body because of the unavoidable loss of that quantity as urine and insensible perspiration.

The trend of events and the physiologic adjustments occurring in a twenty-four hour abstinence from water, such as would occur in an untreated unconscious person, are as follows:

Although the kidneys conserve water by excreting only the obligatory amount of 500 ml. required to eliminate the usual load of endogenous metabolic waste products, the skin and lungs exercise no such conservation of water. This inexorable daily loss of at least 1,000 ml. of essentially distilled water as insensible perspiration produces a hypertonicity of the extracellular fluid. The kidney attempts to correct the hypertonicity by the only means available, which is excretion of the excess salt; however, water is required to accomplish this and an adequate amount cannot be spared for this purpose. Thus some degree of hypertonicity of the extracellular fluid persists.

This hypertonicity inaugurates a shift of fluid from the intracellular to the extracellular compartment until osmolar equilibrium exists between the two compartments. By this mechanism both fluid compartments share the fluid deficit, in amounts proportional to their original fluid mass. The volume of intracellular fluid is more than twice that of the extracellular fluid, and a 1,500 ml. fluid deficit consequently would lower the extracellular fluid volume by only 425 ml.

Thus the general findings in water deprivation are:

1. Relatively great reduction of intracellular fluid volume, which produces thirst, loss of skin turgor, and cracking of lips.
2. Relatively slight reduction of extracellular fluid volume, which produces no appreciable increase in electrolyte concentration, no appreciable hemoconcentration, and no gross pathology of hemodynamics.
3. Oliguria with a high specific gravity.

LOW SALT SYNDROME

The renal defense of salt metabolism is excellent against dietary deficiencies as well as dietary excesses. In fact, the defense against dietary deficiencies is perfect enough to tolerate complete absence of intake of salt for relatively long periods of time. This homeostasis in the absence of intake of salt is due to a practically complete cessation of output by the kidney plus the fact that there are no unavoidable losses such as occur by insensible perspiration in water metabolism.

However, during a time of inadequate intake, if salt losses occur through vomiting, diarrhea, or Wangensteen suction (table 1), a state of acute salt depletion may rapidly develop and may become a pure salt depletion syndrome if salt free fluids are administered. The physiologic mechanisms and trend of events occurring in pure salt depletion, such as would occur in a vomiting patient whose fluids were being restored by intravenous glucose are as follows:

Hypotonicity of the extracellular fluid obviously will occur, and the kidneys will strive to reestablish isotonicity by the elimination of more water. Until the salt deficit becomes pronounced, the kidney will maintain isotonicity at the expense of dehydrating the body. At this stage we see the development of the situation wherein two functions of the kidney become antagonistic, that is, elimination of water to establish isotonicity and retention of water to prevent dehydration. The result is a compromise and milder degrees of both dehydration and hypotonicity exist than would otherwise be present.

This hypotonicity of extracellular fluid through osmotic activity causes water to enter the cells, which further depletes the volume of extracellular fluid. The dehydration developing in the low salt syndrome, in contrast to that of water deprivation, is borne exclusively by the extracellular fluid compartment; in fact the cells even become moderately overhydrated.

TABLE 1.—*Quantities of Fluid and Solute That May Be Lost from the Gastrointestinal Tract in Twenty-Four Hours.**

Secretion	Volume (ml.)	NaCl (Gm.)	Equivalence (milliosmols)
Insensible water loss	1,000		
Salivary	1,500	8	137
Gastric	2,500	18	308
Biliary	500	4	68
Pancreatic	700	6	103
Intestinal	3,000	22	376
Wangensteen suction	4,000	26	445

*Modified from Marriott, H. L.: Water and Salt Depletion, Springfield, Ill., Charles C. Thomas, 1950.

Thus the dehydration associated with salt deficit causes vastly different signs and symptoms from those of pure water depletion, namely:

1. Extensive reduction of extracellular fluid volume, which produces marked hemoconcentration, failure of hemodynamics with fall in blood pressure, and slight to marked reductions of blood sodium chloride.
2. Moderate overhydration of the cells, which produces no thirst, no loss of skin turgor, no cracking of the lips, but listlessness progressing to stupor.
3. Normal urine volume, until late.

The dehydration associated with vomiting and diarrhea is usually a combination of salt depletion and water deprivation, in which the signs and symptoms of pure water loss dominate the picture because of the additive unavoidable loss of essentially pure water from the skin and lungs.

This predominance of the signs of pure water depletion, in a situation where salt is known to be lost, is one of the main reasons for the incorrect conclusions that dehydration does not exist unless such signs

as oliguria and thirst are present. As a matter of fact, such a condition of mixed type of dehydration can readily be converted into the salt depletion type of dehydration by the liberal administration of salt free intravenous fluids.

We wish to emphasize that, aside from the actual reduction of body fluid, there are no common signs or symptoms in the two syndromes that are included under the term "dehydration." In fact, any clinical or laboratory abnormality associated with the dehydration of pure water deprivation is either essentially nonexistent or directly opposite in character to that found in the dehydration incident to salt depletion (table 2).

TABLE 2.—*Major Contrasting Clinical Findings That Occur in the Two Syndromes that Comprise Dehydration.**

Manifestation	Pure Water	Pure Salt
Clinical		
Dehydration		
Extracellular	+	++++
Intracellular	+++	±
Thirst	++++	Absent
Weakness	+	++++
Vomiting	Absent	++++ frequently
Blood Pressure	Normal (till late)	++++ fall
Stupor	Absent (till late)	++++
Laboratory		
Urine volume	Decreased	Normal (till late)
Urine sodium	Present	Absent
Blood sodium	Often increased	Often decreased
Hemoconcentration	Absent (till late)	Marked
Blood nonprotein nitrogen	Slight elevation	Marked elevation

+ to ++++ is a scale from least to greatest.
*Modified from Marriott, H. L.: Water and Salt Depletion, Springfield, Ill., Charles C. Thomas, 1950.

All too frequently these facts are ignored, and the existence of dehydration is considered untenable in a patient in whom oliguria and thirst are absent.

CHANGES IN SODIUM CONTENT

The gradual realization that deficits of body fluids could occur in the absence of the signs and symptoms usually associated with dehydration created the necessity for some other means of diagnosis. The idea was conceived that the concentration of one of the principal electrolytes of the blood (chloride or sodium) would serve as a measurement of the state of hydration of the body. In a pure water deficit the concentration would be high, and in the salt depletion syndrome the concentration would be low. The fact that solutes and water may be lost together and that physiologic compensations sharply alter solute concentrations in any dehydration state seem to have been ignored.

It will be shown, vide infra, that the predication of the state of hydration of the body on the unit concentration of any electrolyte in the blood is untenable. In the first place, as previously mentioned, the tendency is for an increase in concentration in one type of dehydration and a decrease of concentration in the second type of dehydration. Second, one of the most zealously performed kidney functions is to prevent any alteration of total solute concentration of the blood. Last, if the kidney is thwarted in its efforts to preserve isotonicity and some degree of alteration of electrolyte concentration does develop, osmotic shifts of water between intracellular and extracellular compartments occur, always in a direction to minimize any concentration abnormality that exists in the blood.

To illustrate how these physiologic responses so markedly alter the concentration of plasma sodium, let us consider the effect of each function sequentially on a hypothetic case with a given solute and water loss. The basic difference in the pathogenesis of the two types of dehydration creates alterations of the extracellular fluid that require quite dissimilar compensatory functional responses. Therefore, we shall trace the effect of each function on the blood sodium concentration in one type of dehydration at a time.

To illustrate quantitatively the sodium concentration in pathologic states, it is necessary to ascribe definite figures for the normal volumes and solute concentrations of the fluid compartments of the body. The mathematical computations of the fluid compartment volumes and their solute concentrations that occur in various deficit states are based on the assumption that the following quantities are normal:

1. The quantity of the extracellular fluid is 20 per cent of the body by weight (14 liters for a 70 Kg. man).

2. The quantity of intracellular fluid is 50 per cent of the body by weight (35 liters for a 70 Kg. man).

3. The solute concentration of the extracellular fluid is 310 millimols per liter; consequently the total quantity of extracellular solute in the body is 4,340 millimols (14 liters at the concentration of 310 millimols per liter).

4. Sodium constitutes 92 per cent of the total cation present in the extracellular fluid; in other words 142.6 milliequivalents per liter is the normal concentration of sodium in the blood.

5. The concentration of intracellular solutes is also 310 millimols per liter, since it is in osmotic balance with fluids outside of the cell; consequently there are 10,850 millimols of solute within the cells (35 liters at a concentration of 310 millimols per liter).

The fact that these figures for volumes and solute concentrations do not coincide with the values obtained by some investigators is inconsequential as far as utilizing them to determine deviations of blood sodium levels in dehydrated states.

The following is an illustration of how it is possible to determine mathematically the sodium concentration of the blood as well as the extracellular fluid

volume following the occurrence of any given solute and/or fluid loss from the body.

A 70 Kg. man vomits 2 liters of intestinal fluid containing 5 Gm. of sodium. In health this man possessed 4,340 millimols of solute in his extracellular fluid (14 liters at a concentration of 310 millimols of solute), which is constituted of essentially equal quantities of cations and anions. Sodium comprises 92 per cent of the 2,170 millimols of cation, or 1,996 milliequivalents, which amounts to 46 Gm. of total body sodium present in the extracellular fluid.

Immediately after the vomiting of 2 liters of fluid containing 5 Gm. of sodium, the status of his extracellular fluid has changed. The volume is now 12 liters if no fluids are administered, and the solute content is 41 Gm. of sodium or 3,868 millimols of solute (41/46 of 4,340 millimols). Thus his extracellular fluid is hypertonic as a result of the presence of 3,868 millimols in 12 liters of fluid (a concentration of 322 millimols per liter).

Compensatory kidney activities as well as osmotic shifts of fluids will occur in the course of time; however, time adds another complication to the situation. Another liter of essentially solute free water is lost from the extracellular fluid daily as insensible perspiration. The status of this patient's extracellular fluid twenty-four hours following his loss if no therapy is administered is:

Volume: 14 liters — (2 liters of vomitus, 1 liter of insensible perspiration, 0.5 liter of urine) = 10.5 liters.

Solute: 46 Gm. of sodium — (5 Gm. lost in vomitus, plus 3 Gm. excreted in urine) = 38 Gm. The extracellular solute is now 38/46 of 4,340 millimols or 3,585 millimols. The 10.5 liters of extracellular fluid containing 3,585 millimols of solute is hypertonic to the extent of 341.4 millimols per liter.

This patient now has a solute concentration of 310 millimols of solute per liter within the cells and a solute concentration of 341.4 millimols per liter in the surrounding fluid. Water therefore will leave the cell in a quantity great enough to create equality of osmotic pressures on both sides of the cell membrane.

Total body water in this man at the end of twenty-four hours is 45.5 liters (35 liters of intracellular fluid plus 10.5 liters of extracellular fluid). Total body solute is 14,435 millimols (the 10,850 millimols normally present within the cells plus the 3,585 millimols he still possesses in the extracellular fluid). After the osmotic flow of fluid the concentration of solutes both intracellularly and extracellularly will be 14,435/45.5 or 317.2 millimols per liter. The volume of extracellular fluid necessary to create a solute concentration of 317.2 millimols per liter with the 3,585 millimols present in that compartment is 11.30 liters (3,585/317.2). The volume of extracellular fluid was 10.50 liters before osmosis, and a change to 11.30 liters signifies that the cells have given up 800 ml. of fluid to bolster the deficit of the extracellular fluid. The sodium level of the blood after full compensation can be computed by determining 92 per cent of the cation portion of the extracellular solute concentration, that is 92 per cent of 317.2/2 or 145.9 milliequivalents per liter.

A patient who is untreated for twenty-four hours following the vomiting of 2 liters of fluid containing 5 Gm. of sodium will present the clinical picture of simple water loss. He will have some loss of skin turgor, moderate thirst, and oliguria and a slightly elevated blood sodium level. From these observations it would seem apparent that water by mouth or glucose intravenously would promptly correct the abnormality. However, the fact that there is also a deficit of body sodium is not depicted, because fluid is disproportionately more deficient.

This deficiency of body sodium, in the presence of a normal or high sodium level of the blood, can be discerned if the hypothetical patient previously described is given 3 or 4 liters of glucose the following day.

The volume of extracellular fluid and the sodium level at the end of the second day if the patient is given 3.5 liters of glucose will be as follows:

Volume: 11.3 liters at the start of the second day + 3.5 liters of glucose intravenously = 14.8 liters. Lost from the body would be 1 liter as insensible perspiration and 1 liter as urine, giving a volume of 12.8 liters of extracellular fluid before osmotic shifts of fluid occur.

Solute: The total solute of the extracellular fluid would be the same as before (3,585 millimols), except for a small unavoidable loss in the sweat, urine, and feces. The 12.8 liters of extracellular fluid containing 3,585 millimols of solute would have a solute concentration of 280.0 millimols per liter. The total body water is 34.2 liters (intracellular) plus 12.8 liters (extracellular) or 47.0 liters. Total body solute is 10,850 (intracellular) plus 3,585 (extracellular) or 14,435 millimols. Therefore after osmotic shifts of fluid into the cells, the solute concentration in both compartments would be 14,435/47.0 or 307.1 millimols per liter. With

TABLE 3.—*Adjustments in Twenty-Four Hours to Deficits of Fluid*

Condition	Without Compensation		Kidney's Reaction in Respect to :		Serum Sodium After Kidney's Compensation (meq./l.)	Osmotic Flow of Water		Conc. After Compensation by Kidney and Osmosis	
	Total Body Sodium (Gm.)	Serum (ECF*) Sodium (meq./l.)	Water Output (ml.)	Sodium Output (Gm.)		From Cells to ECF* (ml.)	From ECF* to Cells (ml.)	Serum Sodium (meq./l.)	ECF* Volume (l.)
Health	46	143	1,200	4.8	143	Normal	Normal	143	14.000
No food or fluid for 24 hr.	41.2	151.6	500	3.6	147.2	295		143.8	12.795
No food or fluid for 48 hr.	36.4	164.5	1,000	7.2	152.9	604		145.0	11.604

*Extracellular fluid.

3,585 millimols of extracellular solute and a concentration of 307.1 millimols per liter it is obvious that there must be 11.675 liters of extracellular fluid (3,585/307.1). The sodium concentration of the blood will be 92 per cent of the cation portion of the 307.1 millimols of extracellular solute, or 141 milliequivalents per liter.

This patient no longer shows clinical signs of a simple water deficit. His skin is not dry, he is not thirsty, and he is not oliguric. However little has been done to restore his extracellular fluid volume to normal. It has been increased only from 11.3 liters to 11.7 liters, and even that at the expense of creating a mild degree of hypotonicity.

By using these methods of computations it is possible to quantify the state of hydration of the cells, the volume of extracellular fluid, and the sodium level following any type of fluid or solute deficit.

It is granted that the quantities derived by these methods are without doubt in considerable error. Numerous factors that would alter the reported volumes and concentrations have not been taken into consideration. For example, the calculations do not allow for the transfer of sodium into the cells that is known to occur during dehydration. Also no consideration is given to the effect of cell proteins on the osmotic properties of altered concentrations of cell solutes. While these as well as other factors make the reported figures quantitatively erroneous, it is not believed they directionally alter the results.

Table 3 records the values derived by these methods for the alterations occurring in the absence of fluid intake. Depicted is the level to which the blood sodium would go if the kidney did not compensate by reducing urine volume and osmotic shift of fluids did not occur. In addition this table demonstrates the individual effect of the kidneys' compensatory function and the effect of osmosis in dampening the alterations that otherwise would have occurred in the concentration of blood sodium. From these figures it may be noted that a reduction of both intracellular and extracellular fluid volume can occur in a pure water deficit type of dehydration with only an inappreciable rise in blood sodium.

Table 4 in a similar manner records the alterations occurring in a vomiting patient who is being treated with solute free fluids, thereby creating a low salt syndrome. The severity of the hyponatremia that would have developed if neither osmotic nor kidney compensatory action occurred is shown.

Table 4 also quantifies the amelioration of the hyponatremia by kidney compensation alone and then by subsequent osmotic compensation. This table depicts the influence of increasing urine volumes on both the level of blood sodium and the extent of the extracellular dehydration. It is especially interesting to note that the quantity of urine eliminated has little influence on the volume of extracellular fluid. A small urine volume merely increases the degree of hypotonicity of the extracellular fluid and this increased osmotic gradient results in a greater transfer of fluid into the cells. This reciprocal relationship between urine volume and cell overhydration essentially nullifies the effect urine volume otherwise would have on the quantity of extracellular fluid.

A larger urine output does lessen the severity of hyponatremia as well as the extent of cell overhydration. This restoration of isotonicity of the blood by an increased excretion of water by the kidneys represents the chief impetus that creates the paradoxical finding of polyuria in the presence of an actual dehydration of the body. This tendency for polyuria in hypotonic states of the blood represents the principal reason why the absence of hyponatremia should not be accepted as indicating the absence of dehydration.

Table 5 depicts the quantitative changes in the blood sodium and fluid compartments following both

TABLE 4.—*Adjustments in Twenty-Four Hours to Deficits of Sodium.*

Condition	Without Compensation		Kidney's Reaction in Respect to:		Serum Sodium After Kidney's Compensation (meq./l.)	Osmotic Flow of Water		Conc. After Compensation by Kidney and Osmosis	
	Total Body Sodium (Gm.)	Serum (ECF)* Sodium (meq./l.)	Water Output (ml.)	Sodium Output (Gm.)		From Cells to ECF* (ml.)	From ECF* to Cells (ml.)	Serum Sodium (meq./l.)	ECF* Volume (l.)
Health	46	143	1,200	4.8	143	Normal	Normal	143	14.000
Vomiting of 2 l fluid with 5 Gm. Na. Therapy: 3 l. glucose I. V.	36.2	122.7	1,000	0.1	136.0		405	140.9	12.595
			500	0.05	131.65		760	139.6	12.740
Vomiting of 5 l fluid with 15 Gm. Na. Therapy: 5 l. glucose I. V.	26.2	96.3	1,000	0.1	111.7		2,045	134.7	9.955
			2,000	0.2	121.4		1,281	137.4	9.719
			3,000	0.3	133.2		658	140.4	9.482

*Extracellular fluid.

fluid and solute losses. This table also demonstrates that a deficit of extracellular solute results in a decrease of extracellular fluid that cannot be restored to normal volume by solute free fluid regardless of how much is administered. Again it may be observed that the quantity of urine eliminated bears little relationship to the ultimate volume of extracellular fluid, but that a large urine output completely masks the hyponatremia.

Tables 3, 4, and 5 clearly illustrate that there may be little relationship between the state of hydration of the body and the concentration of blood sodium.

It is not meant to imply that changes in sodium concentration of the blood do not occur, nor that such deviations fail to indicate the presence of a dehydration state. However, it is apparent that marked deficits of body fluids may be associated with a high, low, or even normal concentration of sodium in the blood.

TABLE 5.—*Status of Patient Twenty-Four Hours After Fluid Loss and Then Twenty-Four Hours Later After Glucose Therapy.*

Treatment	Urine Vol. (ml.)	ECF* Vol. (ml.)	Sodium Conc. (meq./l.)	ICF† Vol. Changes (ml.)
	24 Hr. After Loss of 4 l. of Fluid Containing 25 Gm. of NaCl			
None	500	10,365	150.7	—1,865
1 l. saline	500	12,165	141.2	+ 335
3 l. glucose	1,000	12,040	142.7n	— 40
	24 Hr. Later After Glucose Therapy			
3,000 ml. of glucose	2,000	12,020	142.7	— 40
	1,500	12,175	141.1	+ 325
	1,000	12,305	139.7	+ 735
	500	12,430	138.2	+1,110

*Extracellular fluid.
†Intracellular fluid.

The directional change in sodium concentration depends on the particular pathogenesis concerned, whereas the severity of the alteration depends on the extent to which the kidney's compensatory action is thwarted.

DIAGNOSIS OF DEHYDRATION

The diagnosis of deficits of body fluids is not primarily a laboratory procedure, and the fallacious practice of concluding that a normal level of blood sodium rules out the possibility of dehydration should be abandoned.

In spite of the fact that there is a great diversity of clinical findings in different patients with dehydration, the diagnosis remains with the clinician. It is true that dehydration can exist in a patient with or without oliguria, thirst, deviations of blood sodium levels, or alterations of the quantity of urine sodium output. However this seemingly chaotic association of signs and symptoms becomes quite orderly if one appreciates the two fundamental modalities of pathogenesis of fluid deficits and then visualizes the chain of events that occur during the ensuing physiologic compensations in each instance.

The history of the patient referable to intake and losses of solutes and fluids is paramount in the subsequent interpretation of both the clinical observations and laboratory data. It is by this method of approach that the pathogenesis of the dehydration is delineated and the clinical findings can be anticipated and the laboratory findings correlated.

From the purely laboratory point of view there does not exist at present any specific test that will either diagnose all types of dehydration or exclude the possibility of their presence. In the past the greatest credence has been placed on the extent of alterations of blood sodium concentration and the degree of hemoconcentration. We have attempted to illustrate the lack of correlation of the blood sodium with the state of hydration of the body. Hemoconcentration as a method of evaluation is based on the concept that the cellular elements were normal in concentration prior to the occurrence of dehydration, a condition which frequently does not exist.

Although laboratory results should never be used as the principal means of diagnosing a dehydrated state, considerable information can be deduced from an interpretation of the urine findings. The correlation of the urinary findings with a dehydrated state is based on the assumption that no abnormality of urine formation exists such as would occur with insufficiency of either the pituitary body, adrenal glands, kidneys, or heart. If no such dysfunction exists, a twenty-four hour urine volume of more than 1,000 ml. usually excludes the possibility of a pure water deficit type of dehydration. On the other hand 3 Gm. or more of sodium chloride per liter of urine makes the possibility of a low salt syndrome unlikely. In other words a daily volume of over 1,000 ml. of urine containing more than 3 Gm. of sodium chloride rules out the possibility of either type of dehydration, providing there exists no intrinsic impairment of salt or water metabolism.

CONCLUSIONS

Dehydration is a common finding in two otherwise distinctly different syndromes. The water depletion syndrome is readily recognized from its subjective and objective signs of thirst and oliguria. The dehydration incident to salt depletion is not readily recognized because of the absence of signs and symptoms commonly accepted as being typical of dehydration. The low salt syndrome is usually a hospital created phenomenon, being created in the patient who has lost both salt and water and receives only salt free fluid therapy. The mixed type of dehydration evokes the signs and symptoms of a water depletion syndrome and not those of a low salt syndrome.

Sodium concentration of the blood is an exceeding-

ly poor indicator of the severity or even the presence of dehydration. Urine volume together with its salt content can be utilized to exclude dehydrated states as well as to indicate the possibility of their presence.

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ABSTRACT OF DISCUSSION

DR. W. N. POWELL, Temple: Ideas regarding the water and electrolyte needs of patients, particularly postoperative patients, have undergone several radical reversals during the past thirty years. In the period dating from about 1920 it was almost routine practice postoperatively to give patients several liters of isotonic saline solution daily. When salt deficits existed, this was beneficial; but when such deficits were not present, it was often harmful. By about 1945 it began to be generally recognized that large amounts of salt could do harm. Less and less salt began to be used so that eventually some surgeons were giving almost no saline solution at all, but were administering 3 to 4 liters of glucose in water per day. This practice at times leading to water intoxication, was just as pernicious as the abuse of saline.

Now a more rational approach to the problem is being made. As the essayists have pointed out, both clinical and laboratory findings must be taken into account in estimating the need for water and salt. Flame photometry enables one to measure serum sodium levels quickly and accurately, but, as has been shown, the result taken by itself can be misleading. In our zeal for the new we are apt to forget the value of older tests such as determination of the chloride content of the urine. This is especially valuable, as has been pointed out, for the detection of extracellular fluid volume deficit or the salt depletion type of dehydration. Such dehydration is particularly dangerous since it may go unrecognized because of the absence of thirst and other symptoms ordinarily indicative of dehydration. As the essayists have stressed, except in Addison's disease and some renal disorders, a patient cannot be dehydrated if both volume and salt content of his urine are normal. In postoperative and other patients likely to suffer upsets in electrolyte and fluid balance, the routine measurement of urine volume and urinary chloride content, together with the use of balanced salt mixtures providing potassium as well as sodium, will do much toward the prevention of electrolyte and fluid imbalance.

VA Records Available in Industrial Cases

Physicians who handle industrial injuries under the Employers Liability and Workmen's Compensation Law of Texas may obtain from the Veterans Administration medical histories and other reports having a bearing on the case, L. H. Flewellen, chairman of the State Industrial Accident Board, has announced. The Veterans Administration has released the following regulation relating to the subject:

"When a beneficiary (veteran or his legal beneficiary) elects to obtain medical attention from a private practitioner or in a hospital other than a VA hospital, there may be disclosed to such private practitioner or head of such hospital such information as to the medical history, diagnosis, findings or treatment, as is requested, provided there is also submitted a written authorization from the beneficiary, or in the event he is incompetent, from his representative or his nearest relative, for release of desired data."

Veterans Administration Form 3288 is used for requesting this information. The forms should be ordered, executed, and returned to one of the regional offices nearest the veteran's home residence. In Texas inquiries and the completed forms should be sent to the Veterans Administration Regional Office at one of the following addresses: 912 South Ervay, Dallas; 309 Dwyer Avenue, San Antonio; 2320 LaBranch, Houston; 1600 Nineteenth Street, Lubbock; 723 Franklin Avenue, Waco.

WARNING ON CHLOROMYCETIN THERAPY

The American Medical Association has issued a warning to physicians against the promiscuous use of chloromycetin, urging that doctors be alert for reactions following use of this or any other newer drug.

An editorial in the June 28 issue of *The Journal of the American Medical Association* states that chloromycetin has been responsible for bringing on the frequently fatal complication of aplastic anemia. The disease occurred in patients who were receiving large doses of the drug or in patients who had kidney insufficiency. The Association's editorial warning preceded three articles by physicians blaming chloromycetin for bringing on aplastic anemia.

DRASTIC SODIUM DEPLETION IN THE TREATMENT OF ESSENTIAL HYPERTENSION

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It is known that dehydration and semistarvation[1] are accompanied by hypotensive states. Electrolytic imbalance may have similar consequences. This imbalance may consist of decreased sodium and increased potassium in the serum, as in Addison's disease. Theoretically, similar effects, including adrenocortical hyposecretion,[4] should be obtainable by drastic sodium depletion, especially if combined with a high potassium intake.[5] Actually, lowering of blood pressure in some hypertensive patients has been achieved by a low salt intake alone.[1, 3, 5, 7]

Conversely, a high sodium intake,[10] especially if combined with the salt-retaining desoxycorticosterone[8] or possibly marked restriction of potassium intake,[5] may elevate the blood pressure in essential hypertension as in Addison's disease and postural hypotension, where the effect is more clearly observed. There is some evidence that sodium retention[2] and deposition in arterial walls[13] are characteristic of essential hypertension.

In the following study marked sodium depletion was achieved by a 200 mg. sodium diet, mercurial diuresis, and unrestricted potassium intake.

METHOD

The subjects were 46 outpatients with uncomplicated essential hypertension, their blood pressures ranging from 160/100 to 230/130 on casual readings. Drastic sodium depletion was accomplished by restricting the sodium content of the diet to 200 mg. and by subcutaneous administration twice weekly of 2 cc. of mercaptomerin (Thiomerin) or meralluride (Mercuhydrin Sodium Solution). Blood pressures in the right arm were checked in triplicate after rest in the sitting position at each biweekly visit. At the same time blood samples and urine excreted during a twenty-four hour period were obtained for the determination of serum sodium and sodium clearance.* The same studies were conducted during a three week control period, during which the patients were on a regular diet and received one lactose tablet three times daily after meals. Symptoms during both regimens were recorded at each visit.

All the blood pressures (72 per patient) obtained during the control and sodium depletion periods were then compared by the statistical methods used in our previous studies of hypotensive measures.[9]

RESULTS

The effects of drastic sodium depletion on the blood pressures are summarized in table 1. A hypotensive action of the regimen is clearly shown both in the systolic and the diastolic blood pressure. In at least three-fourths of the cases the drop in the diastolic blood pressure is highly significant statistically (probability <0.01).[10] The blood pressure fall was more marked in the second and third week of the low salt regimen.

Headache present in the control period disappeared in 15 of the 46 cases. Dyspnea was similarly abolished in 3, peripheral edema in 1, and precordial oppression in 3 instances. Untoward symptomatic effects, not present in the placebo period, included muscular weakness in 15 cases, syncope in 2, nausea and vomiting in 6, mild diarrhea in 5, abdominal cramps in 4, and leg or arm cramps in 8 patients. More marked signs of the low salt syndrome were not seen. In particular, renal function was not adversely affected; the blood nonprotein nitrogen level often fell and never rose more than 10 mg. per 100 cc. (or above 45 mg. per 100 cc.).

Serum sodium levels, originally normal or high normal (135 to 155 mg. per 100 cc.) in 41 of the 46 patients fell below 135 mg. per 100 cc. in 16 cases. The lowest level attained was 119 mg. per 100 cc. The descent in serum sodium was stepwise week after week in many cases. There was no correlation between the degrees of fall in serum sodium and in diastolic pressure. Sodium excretion and sodium clearance fell with the diminished salt intake following the slight mercurial diuresis. The serum potassium, measured in a few instances, was unchanged. The subjects typically lost 5 to 10 pounds in weight.

The vital capacities and maximum breathing capacities were usually unchanged and rose only rarely, presumably in patients with latent pulmonary congestion. On the other hand, the response to tetraethylammonium chloride was often exaggerated during the period of drastic sodium depletion. In three instances near-syncope resulted from 0.5 Gm. of intravenous Etamon Chloride, with blood pressure falls to 50/0, 80/10, and 70/60 respectively.

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**Serum sodium was determined by a flame photometer, and sodium clearance was calculated by the formula $\frac{UV}{P}$, with U=milligrams of sodium per 100 cc. of urine, V=cubic centimeters of urine excreted per minute, and P=milligrams of sodium per 100 cc. of plasma or serum.*

COMMENT

Drastic sodium depletion is an effective means of producing temporary hypotensive effects in cases of essential hypertension. In some patients carried on this regimen for periods exceeding three weeks, the blood pressure rose, although it remained below the control levels. That depletion of the sodium ion is responsible for the observed effects is proved by the fact that excessive sodium intake reproduces and even intensifies the hypertensive syndrome seen in the placebo period.[10] This hypertensive effect of the sodium ion is more clearly noted, with concomitant desoxycorticosterone administration, in cases of Addison's disease.[8]

In 5 additional cases of malignant hypertension with renal and cardiac damage the results were almost as dramatic, although "normal" levels of blood pressure (below 150/90), frequently attained in the benign group, were not reached. On the other hand, as reported by others,[6] 2 of these hypertensive patients showed marked reversals in electrocardiogram tracings, 3 showed retinopathy, 2 had significant reductions of cardiac size, and 4 showed marked symptomatic improvement secondary to the lowering of the diastolic pressure-dam. Untoward renal effects included rises of the blood nonprotein nitrogen levels of 18 and 24 mg. per 100 cc. to 66 and 84 mg. per 100 cc. in 2 of the 5 cases.

In regard to the mechanism of the hypotensive effect, it is known that, just as adrenocortical insufficiency leads to sodium depletion and falls in blood volume and arterial pressure, the reverse also may be the case.[4] A condition of functional exhaustion of the adrenal gland probably is produced. Furthermore, diminution of vasospasm is shown by the increased lability of the diastolic pressure in the hypotensive[10, 12] and microplethysmographic[6] response to tetraethylammonium salts.

Symptomatic improvement, particularly in headache, was counterbalanced by the development of a mild low salt syndrome, with weakness, fatigability, and gastrointestinal disturbances. Progressive renal impairment, in contrast to its frequent, dangerous, and even fatal occurrence in patients with cardiac failure[12] and advanced or malignant hypertension[6] on this regimen, was not noted in any instance. It can be claimed that continuation of the low salt regimen would have resulted in more obvious renal damage. However, the more likely reason for relative tolerance of such drastic sodium depletion in this group of patients was that they had adequate renal functional reserves. Frequent checks on renal function during the course of this mode of therapy always are advisable.

TABLE 1.—*Systolic and Diastolic Blood Pressure Changes from Placebo Period Levels to a Regimen of Drastic Sodium Depletion in 46 Cases of Essential Hypertension.*

Pressure Change	—40 to 50 mm.	—30 to 40 mm.	—20 to 30 mm.	—10 to 20 mm.	—0 to 10 mm.	+0 to 10 mm.
Systolic	1	5	21	14	4	1
Diastolic	0	1	7	19	18	1

SUMMARY

Drastic sodium depletion—a 200 mg. sodium diet plus mercurial diuresis twice weekly—caused decreases of more than 10 mm. of mercury in the diastolic blood pressure in 27 of 46 patients with benign essential hypertension. Statistically significant hypotensive effects resulted in about three-quarters of the cases.

The hypotensive effects were accompanied by weight loss, frequent falls in serum sodium levels, and occasional mild manifestations of the low salt syndrome.

The mechanism of the hypotensive action of marked sodium removal may be related to functional adrenal exhaustion and decreases in salt content, swelling and spasm of the arterioles.

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ABSTRACT OF DISCUSSION

DR. FREDRIC B. FAUST, Littlefield: The sodium depletion approach to the treatment of essential hypertension has been finding increased favor in the literature. Articles concerning starvation states in Europe during the past war and the frugal diets of Asiatics have increased the acceptance of the "rice" diet.

Too often physicians hand patients the dietary instructions and expect that to end the interview. We tell them not to use salt, baking soda, bicarbonate, and baking powder. From a practical stand, the diet will be horrible! At our clinic we have evolved the following diet routine. For the first three days the patient is placed on the Kempner diet; then he is placed on a 200 mg. sodium diet. We encourage the use of Lonalac in milk shakes and in cooking, particularly low sodium bread. After the patient has endured the regimen for a week or two, he is introduced to one of the salt substitutes. By this time the palate has become insensible and the salt substitutes make the foods palatable.

Until the days of flame photometery and Gamble's book on extracellular studies, our physiology and pharmacology taught us that mercury interfered with the nephron in tubular resorption of water. It is now believed that mercury interferes with resorption of sodium. In our clinic we found the following test on the urine of patients a great aid in keeping the patient on the diet: To 10 drops of urine in a test tube, add 1 drop of 10 per cent potassium chromate; then add a drop at a time of 0.73 per cent silver nitrate, shaking between drops, until a brick red color develops. If the low sodium diet (200 mg.) is being followed satisfactorily, the test will end after adding 1 to 8 drops of the silver salt. We have found that during the first few days of the low salt diet the sodium content of the urine is high and then comes down rapidly to completion of the test after adding 3 to 8 drops of silver nitrate. Some patients have paralleled a reduction in the blood pressure readings in their urinary sodium content. Many patients are as interested in their urine sodium as in the blood pressure reading. Often a rise in both can be attributed to some incident in food indiscretion as well as psychological upset.

The low salt syndrome has not been reached in our cases because of the homeostatic factors of nature forcing the patient to take a little salt, which is found at the next urinary sodium test. We also have not pushed therapy to attain "normal" blood pressure levels of 150/90 as we believe a patient with a long standing blood pressure at very high levels will do better with moderate lowering rather than reduction to usual normal levels.

At the Payne-Shotwell Foundation in Littlefield we have been using the mercury sodium depletion method for the past two years. It is used routinely in severe hypertensive cases and, as Dr. Ruskin has demonstrated, cephalgia, dyspnea, dependant edema, and precordial pain have been eliminated, accompanied with a lifegiving loss of weight.

DR. RUSKIN, closing: Urinary tests for salt are excellent checks on the patients. On the other hand, we have had no difficulty in getting the patients to stick to strict sodium depletion.

In reference to the work of Drs. McQuarrie and Friedman and his associates, we have so far not been able to note any great effects on the blood pressure of hypertensive patients as a result of potassium depletion or repletion. McQuarrie noted a hypertensive effect from sodium repletion and a hypotensive effect of potassium repletion (with restriction of sodium) in diabetic patients. Friedman and co-workers noted in rats the hypotensive effect of potassium removal when sodium was restricted at the same time. We have been unable to confirm these findings in essential hypertension.

The effects of marked sodium repletion, on the other hand, are definite hypotension in the majority of cases, and the reverse effects of sodium repletion occasionally are dramatic.

CATION EXCHANGE RESINS

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IT is known that the kidneys of cardiac patients cannot excrete sodium chloride efficiently. Experiments concerning the rate of excretion of sodium conducted by means of radiosodium have shown definite retention of this element during heart failure, the amount of retention being roughly commensurate to the degree of failure. Periods of compensation are accompanied by sodium diuresis. Tracer studies have shown that a normal person excretes half the total body sodium in about fifteen days, whereas a patient with chronic congestive failure requires forty days.

It is believed that the disturbances leading to the retention of salt and water are primarily of cardiac origin and involve some mechanism set in action by a deranged heart and mediated through the kidneys. Such a mechanism is responsible for many, if not most, of the distressing symptoms associated with congestive failure. When this physiologic imbalance is influenced favorably, chronic cardiac patients can be made relatively comfortable for long periods, limited probably by the rate of progression of the primary cardiac disturbance. The manner in which other factors supervene to alter this situation will be discussed at length later.

Eventually, the purposes of therapy in the management of congestive heart failure may be more clearly defined. Wherever possible, drugs and methods of controlling edema should be used, not indiscriminately, but to exploit their primary actions. Unfortunately, at present this objective is not always to be attained.

In the light of studies of water and electrolyte balance presently in progress, it is not unreasonable to assume that in the near future simpler and more prac-

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tical tests may be devised for a reasonably accurate determination of the electrolyte composition of plasma and, at least by inference, of the extravascular compartment. When information of this nature is more readily accessible, the fluid and electrolyte balance in the great majority of the cases can be more accurately and scientifically controlled. Such control may be accomplished by diet; by digitalis, if the heart failure is primarily on a myocardial basis and involves cardiac dilatation; or, if the purpose of therapy is the removal of excess salt and water, by mercurial diuretics. The xanthine derivatives appear to be of some value in enhancing this mode of diuresis. The latest weapon in our armamentarium, the cation exchangers, may be used to decrease the absorption of sodium from the gastrointestinal tract.

Because the chronic cardiac patient tends to retain sodium, at least a moderate restriction of this substance in the diet is indicated. Since the normal diet may contain as high as 4 to 6 Gm. of sodium per day, a moderate restriction (that is, to a level of 1.5 to 3.0 Gm.) may be all that is necessary. A diet of this type is not difficult to prepare and places little hardship on the patient. Restriction to 0.5 to 1.5 Gm. of sodium a day is much more difficult. The preparation of such a diet in the home involves special foods and considerable trouble. Patients usually object strenuously to the flat taste of food without salt. Because of this, such a spartan diet should be prescribed only when absolutely indicated and, even then, with great understanding of the burden being placed on the patient. Such restriction may be used with special benefit when congestion and edema is uncontrollable by other means or when frequent use of mercurial diuretics has become distressing. Restriction to less than 0.5 Gm. of sodium a day is especially difficult to attain and should be required only with the most severe cases. Restriction to 50 mg. daily is actually feasible, provided the cooperation of the patient can be obtained. As a rule, however, this is practicable only for brief periods. Such a diet consists of Lonalac and orange juice, to which are added sugar and, if desired, other flavoring.

When even moderate sodium restriction is indicated, care must be taken to assure that the water which is consumed does not contain inordinate amounts of sodium. The physician, therefore, should familiarize himself with the mineral content of the water supplies in his locality.

USE OF CATION EXCHANGERS

Although dating back in history to the time of Aristotle, the use of ion exchange in chemistry, industry, and medicine is a relatively recent development. The principle of ion exchange, or removal of electrolytes from solution by reactive chemical groups contained within the structure of an inert mass, probably was first used in a crude sense in the purification of water with sand. The other numerous industrial uses of the ion exchange principle probably would make a fascinating study.

The chemistry of cation exchange is too complicated for a discussion such as this. Briefly, the cation exchange resins are insoluble, complex polymers of high molecular weight appearing grossly as granules or powdered particles of varying size. Structurally, these masses are spongelike, the molecular elements being arranged in such a manner as to surround myriad pores and passages through which a solution can diffuse with ease, its ions coming into intimate contact with multiple exchange sites located on the many surfaces of the porous mass. The resins are stable but, because of the multiple exchange sites attached to them, are able under suitable conditions to bind diffusible ions in exchange for other ions of like charge. Ions in the solution in which the resin granules are placed may be removed from solution by exchange with the ions originally held at the exchange sites.

The "potential" of the resin depends on (1) the number of milliequivalents of electrolytes that it is able to remove from the solution and (2) the rapidity with which this is accomplished. The "cycle" or "form" of a resin refers to the ion, originally attached to the exchanger, which is to be traded for the diffusible cation in solution. Many factors are involved in controlling the potential of a resin, particularly in its relationship to any single cation. The two most important factors of the cation are valence and atomic weight. Atoms of higher valence tend to displace those of lower valence (for example, calcium displaces sodium). Valences being the same, ions of higher atomic weight tend to displace ions of lower atomic weight (for example, potassium displaces sodium). These factors are not so important in nonaqueous solutions as they are in dilute aqueous solutions, and in highly concentrated solutions, these tendencies may be reversed or may not hold entirely true to form. In addition to the factor of ionic concentration, the hydrogen ion concentration of the solution in which the resin works determines to a great degree the efficiency of the exchanger, especially of the carboxylic type. Thus, it appears that cation exchangers react according to well-defined physicochemical laws.

In 1946,[2, 3] Dock first presented before the Association of American Physicians a preliminary report concerning work he had done using the cation exchange principle in animals with the object of removing sodium from the gastrointestinal tract. He believed

that perhaps by using this technique in the cardiac patient, enough sodium could be removed from the contents of the alimentary canal to allow the taking of a diet higher in salt content without producing or increasing the formation of edema. According to studies reported by Fischer in the *American Journal of Physiology* in 1944, an amount of sodium equal to the entire quantity normally present in the human body diffuses into and out of the gastrointestinal tract every two hours. Theoretically, therefore, one can entertain the possibility of total depletion of body sodium by the use of cation exchangers. This goal has proved unattainable, probably because of the factors and conditions of exchange alluded to above.

Cation exchangers are of value in medicine primarily in the treatment of congestive heart failure. They also have been used as a remedy for the ascites occurring with hepatic cirrhosis, for removal of potassium in certain types of renal failure, and to effect a low-sodium intake in the treatment of hypertension.

Two functions are responsible for the beneficial effect of cation exchangers in congestive heart failure: first, and mainly, the fixation of sodium in the gastrointestinal tract and its removal in the stool, and, second, the production of a state of compensated acidosis, the enhancing of mercurial diuresis, and the stimulation of renal compensatory mechanisms leading indirectly to increased urine formation and sodium excretion.

In animals the urine can be rendered almost sodium-free by cation exchange resins, coincident to which there is noted a commensurate increase in the sodium content of the stool. Therapeutically, such a nearly complete state of sodium depletion is not to be recommended in the treatment of congestive heart failure, even though it is presumably feasible in man. If half of the ingested sodium can be removed in the stool by use of cation exchangers, good therapeutic results can be obtained by a moderate dietary restriction of sodium to 2.0 to 2.5 Gm. per day. Such a regimen will result in the clearing of edema in most cases.

TYPES OF CATION EXCHANGERS

There are essentially two types of cation exchangers: carboxylic acid resins and sulfonic acid resins. The action of carboxylic resins is based on weak, rather than strong, acids. Though in vitro they have an adsorptive capacity of 10 milliequivalents per gram of resin, this potential is available only at a hydrogen ion concentration of 10 to 11, decreasing rapidly as the hydrogen ion concentration falls below 10. The rate of ion exchange of carboxylic resins is less than that of the sulfonic acid type.[1] Although the ion fixing capacity of sulfonic acid resins is not so great as that of the carboxylic type, their entire capacity is available at a hydrogen ion concentration of 3 or more, and the ion exchange rate is greater than that of the carboxylic resins.

Either type of resin may be administered in the hydrogen or ammonium cycle. There are certain disadvantages to the use of the hydrogen cycle resin. The hydrogen form liberates free hydrogen ion in the esophagus, causing at times a disagreeable retrosternal burning sensation. Great discomfort in the mouth, esophagus, and stomach may be encountered with several of the sulfonic acid exchangers in the hydrogen cycle because of the rapid release of free hydrogen ion. Nausea and vomiting may be intense. The exchanger in the sodium cycle, on the other hand, is tasteless and causes no distress. The resins themselves are insoluble and nontoxic, although when large doses are given, fecal impactions may occur.

Some resins are being produced in the ammonium and potassium cycle, these ions being present in either 2:1 or 3:1 ratios. The ammonium ion liberated in the gastrointestinal tract by this type of resin is exchanged for sodium or potassium. Because it is ten times as abundant in most of the available capacity as other cations, sodium will occupy half of the exchange capacity in spite of the low affinity of the resins for this ion. The ammonium ion is absorbed from the gastrointestinal tract as ammonium chloride and is converted by the liver to urea. The chloride ion left in the plasma following this conversion is excreted in the urine combined with ammonium ion and fixed base, producing—initially at least—a state of compensated acidosis. One commercially available resin has an anion exchanger added in small quantities with the purpose of preventing or modifying the degree of acidosis.

Of academic interest is the fact that small amounts of organic cations such as vitamins and amphoteric amino acids also are fixed and removed in the stool by the cation exchangers.

DOSAGE AND ADMINISTRATION

The dose of cation exchangers varies with the resin used and the condition and tolerance of the patient. The resin may be given in capsules or mixed with any food, or it may be allowed to sink in water to the bottom of the glass and be sucked up through a glass tube. (Experiments indicate that the exchange is completed more in the stomach than in the lower intestinal tract and therefore is influenced by dietary concentrations of electrolyes.) The usual assumption is that 3.0 Gm. of sodium must be removed to mobilize 1 liter of edema fluid. The amount of sodium absorbed from a normal diet rarely exceeds 1.0 milliequivalent per gram of exchanger, or 2 per cent by

weight. The degree of uptake will be considerably less on diets low in sodium. The amount of sodium bound by sulfonic and carboxylic resins in vivo is variable and has been estimated at 1.0 milliequivalent per gram of sulfonic acid resin and 0.9 milliequivalent per gram of carboxylic resin. This may be erroneous, since the apparent exchange potentials clinically are about equal for the two resins. However, on a very low sodium diet sulfonic acid resin has been shown to lose only 10 per cent of its cation binding efficiency, while the carboxylic resins may lose up to 50 per cent. The optimum daily dose of resin seems to lie between 40 and 100 Gm. These amounts will fix and usually will prevent the absorption of 1.0 to 2.5 Gm. of sodium. If ingested with food, or shortly before or after meals, both carboxylic and sulfonic types will probably bind about 1.2 milliequivalents or 28 mg. of sodium and 1.0 milliequivalent or 39 mg. of potassium per gram. The amount of calcium diversion is considerably less, although probably not entirely negligible.

SIDE-ACTIONS, TOXICITY, AND CONTRAINDICATIONS

As has already been pointed out, when sodium is bound, hydrogen or ammonium ions are liberated and absorbed, resulting in a state of compensated acidosis. Each 100 milliequivalents of cation taken up by the resin liberates 100 milliequivalents of ammonium or hydrogen ion, resulting in an acidifying effect. Buffer and renal mechanisms are then called into action, and a state of "compensated" acidosis is produced. This not unphysiologic type of acidosis is beneficial in the treatment of congestive heart failure and is not unlike the administration of ammonium chloride in its effects. Diuresis is enhanced, edema is cleared, and the congested organism is thereby benefited.

Normal kidneys combat acidosis by excreting a highly acid urine with a hydrogen ion concentration of 4.4 to 4.7. In the presence of severe (that is, uncompensated) renal disease, the important selective actions of reabsorption, rejection, and secretion of ions is lost. It is well known that the administration of therapeutic doses of ammonium chloride in cases of advanced nephritis may produce a state of uncompensated acidosis. Cation exchange resins in the ammonium and hydrogen cycles have a similar action and are contraindicated in cases of nephritis. If the maximum number of patients is to obtain the benefits of cation exchange, cases of true nephritis must be differentiated from those of congestive heart failure. This is not always simple. In congestive failure there is reversible impairment of renal function, probably due to venous engorgement and cloudy swelling. Treatment directed to the failing heart usually will restore renal function in these cases.

Depletion of potassium constituted a real danger in the earlier days of resin therapy. This potential hazard was intensified by the paucity of practical methods for the early detection of the hypokalemic state. Determinations of serum potassium levels failed to give true insight into the immediate physiologic effect produced by deficiency of this essentially intracellular ion. Considerable reliance has been placed on changes in the electrocardiogram as a means of detecting early upsets in potassium balance. On the whole, this has proved in clinical application to be a cumbersome and highly unreliable means of averting disaster. Fortunately, most resins in use at the present time contain enough potassium cycle cation exchanger to circumvent potassium depletion.

In 1949,[5] Henry Schroeder published his work on the "low salt syndrome." The importance of recognizing and treating this condition has been increasing with the wider application of salt restriction in congestive failure and with the overenthusiastic use of mercurial diuretics. Most characteristically, the low salt syndrome is seen postoperatively when dextrose solution has been used without replacement of electrolytes or when large amounts of sodium chloride are lost from the body for any reason. Some impairment of renal function is presumed to be present since the electrolyte preserving function of the organism is apparently lost, though perhaps only transiently. In essence, the pathologic physiology of the low salt syndrome consists of hyponatremia and hypochloremia in conjunction with an excessive tissue hydration. Decrease in urinary chlorides, increase in the nonprotein nitrogen, tachycardia, and a falling urinary volume are characteristic. The typical clinical picture is heralded by drowsiness and marked lethargy with subsequent loss of appetite and thirst. Intense nausea and vomiting follow shortly, aggravating the electrolyte loss; soon after, the patient complains bitterly of abdominal and muscular cramps. Delirium, psychotic behavior, and coma characterize the terminal phase.

The characteristics of the low salt syndrome probably depend on the extracellular fluid mass containing an amount of sodium chloride insufficient to maintain normal osmotic equilibrium. Intracellular fluids are probably also increased, the result being a state of overhydration identical to what in other circumstances is called water intoxication.

Fortunately, the low salt syndrome is rarely encountered as a complication of cation exchange therapy alone. Although a sodium depletion state may arise during either resin therapy or mercurial diuresis, whether or not a true low salt syndrome will complicate the picture depends in essence upon the state of the chloride ion in relationship to the extracellular levels of the other electrolytes. Mercurial diuretics impair the tubular reabsorption of sodium and chloride, resulting in the increased excretion of these ions.

Chloride, however, is excreted out of proportion to sodium, as recently demonstrated by Squires and his group, not only producing a state of metabolic alkalosis (by expansion of the bicarbonate compartment) but also, in view of the resultant hyponatremia and hypochloremia, predisposing to the development of the low salt syndrome. In contrast, cation exchange therapy, in a manner previously described, induces a hypochloremic acidosis, a state which is patently incompatible with the existence of the low salt syndrome as defined. Despite this, the physician who attempts to reinforce the action of cation exchange resins with frequent injections of mercurial diuretics must realize that he risks the development of the low salt syndrome by thus inducing a "saluresis." However, this should not discourage the intelligent use of occasional injections of small doses of mercurials as an adjunct to resin therapy, the danger of which is minimal and the value of which is borne out in clinical practice.

Diagnosis of the low salt syndrome can be confirmed by plasma electrolyte studies. If a flame photometer is not available, the diagnosis can be based fairly reliably on demonstrating a low total fixed base and depressed urine chlorides in the absence of a decrease in plasma bicarbonate. Treatment consists of the administration of salt. Isotonic salt solution is of little benefit in this condition since it does not adequately increase the concentration of sodium chloride in extracellular fluids. Intravenous injection of hypertonic saline solution is the indicated treatment. Schroeder recommends an osmolar solution containing 5.8 per cent sodium chloride.

Vitamin deficiencies due to cation exchange therapy[4] have never proved to be a serious problem. The cautious physician, however, will doubtless wish to prescribe supplementary vitamins to patients receiving resins.

COMMERCIAL EXCHANGE RESINS

Several exchange resins are commercially available. Carbo-Resin, or Amberlite (Lilly) is a carboxylic acid resin, two-thirds in the hydrogen cycle and one-third in the potassium cycle. A small amount of anion exchanger is added to reduce the likelihood of acidosis. Resodec (Smith, Kline and French) is a carboxylic acid resin in the ammonium cycle. Natrinil (National Drug Company) is a carboxylic resin in the hydrogen cycle. Our personal experience has been largely with Katonium-K (Win 3000 or Permutite Z), furnished through the courtesy of Winthrop-Stearns, Inc. Katonium-K is a sulfonic acid resin, 75 per cent in the ammonium cycle and 25 per cent in the potassium cycle. As previously stated, sulfonic acid resins have a wider range of action and a more rapid rate of exchange than the carboxylic acid types. Sulfonic acid resins may also be more effective since on a low sodium diet they lose less of their sodium binding efficiency.

CONCLUSIONS

Based on clinical observation during the past year of between 200 and 300 cases of congestive failure of varying degree, our opinion is that sulfonic acid resins are better tolerated by the patients than are the carboxylic acid resins. The ammonium form is not usually objectionable, causing nausea and gastrointestinal discomfort in only rare cases. Fecal impactions are easily avoided but occasionally occur despite alertness on the part of the patient and physician. With doses ranging from .5 to 2 ounces of resin daily over prolonged periods, smaller doses as a rule being used after the first several days of treatment, no untoward symptoms have been encountered. There have been no cases of potassium deficiency nor of vitamin deficiency. One case of clinically apparent acidosis was anticipated and encountered in a patient with advanced nephritis. Only 3 patients stubbornly refused to take the resin. In a few it was discontinued as a matter of choice when clinical improvement permitted. The majority of the patients were maintained on a low sodium regimen and most received periodic injections of mercurial diuretics. The low salt syndrome did not occur in any of these cases. Two or 3 patients were unable to tolerate the sulfonic acid resins but did very well with the carboxylic type.

Conservatively, it may be stated that, properly used, the cation exchange resins are a helpful and valuable adjunct to the treatment of congestive heart failure. There are limitations to their effectiveness, some of which must be accepted and some of which undoubtedly will be overcome in the future.

One must not lose sight of the fact that not all symptoms of congestive heart failure are due to sodium retention. In rheumatic heart disease, for instance, acute rheumatic myocarditis and its accompanying heart failure may be encountered in spite of the use of resins. The need for digitalis in treating the failing heart has been even more clearly delineated by the many cases which fail to respond to cation exchange resins alone. When the myocardium is riddled with scar tissue as the result of coronary artery disease, the effective force of the cardiac contraction is gone. Obviously, resins can be of little imaginable value in such cases.

It certainly must become apparent that success with the clinical use of cation exchange resins depends to a great extent on the astuteness of the physician, his familiarity with the principles of fluid and electrolyte balance, and his awareness of the pathologic physiology underlying the disease which he is treating.

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EFFECTS OF DIGITOXIN ON HEPARIN TOLERANCE, COAGULATION TIME, AND PROTHROMBIN ACTIVITY

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In recent years there have appeared several reports suggesting that digitalis glucosides produce increased coagulability of the blood. Werch[9] in 1943 reported shortening of the coagulation time in rabbits following administration of digifolin. Macht[4] confirmed this study in cats, reporting progressive shortening of the coagulation time with the injection of increasingly larger doses of tincture of digitalis. In human subjects Massie and others[5] noted that coagulability of the blood as estimated by the Lee and White method was accelerated during the active period of digitalization. Prothrombin activity, however, was not altered. Using a different approach, de Takats, Trump, and Gilbert[3] reported flattening of heparin tolerance curves, suggesting increased blood coagulability, in dogs and human subjects after administration of digitalis.

The application of these findings to clinical problems led Askey and Neurath[1] to analyze 84 patients with auricular fibrillation. They made the observation that the mortality rate was higher in the group receiving digitalis. They suggested further that the high incidence of thromboembolic deaths in patients with myocardial infarction who had received digitalis contraindicated its use in that condition.

Reports denying any significant alteration of the coagulability of the blood by digitalis include an exhaustive pharmacologic study by Ramsey, Pinschmidt, and Haag.[6] In 3,000 tests on dogs and cats, the authors found no significant alteration of the coagulation time or prothrombin activity after either oral or parenteral administration of digitalis. In vitro addition of digitalis to untreated whole blood and to whole blood containing heparin produced no change from the control values. Similar animal and in vitro experiments of Richardson and Walton[7] also produced negative results.

In human subjects, Sokoloff and Ferrer[8] observed no consistent alteration of the whole blood coagulation time in 10 patients who had been given digitalis for congestive heart failure. The authors emphasized the considerable variation in coagulation time values from day to day and from patient to patient. Cotlove and Vorzimer[2] reported no effect of digitalis on prothrombin activity in 18 cardiac patients.

In view of the contradictory reports in the literature and because of the importance of digitalis as a therapeutic agent in cases subject to thromboembolic phenomena, the following studies were undertaken.

METHODS

All experiments described were performed on patients who had no subjective or objective evidences of congestive heart failure or thromboembolic disease.

TABLE 1.—*Coagulation Time Tests on Whole Blood Using the Lee and White Method and the Silicone Coated Tube Method.*

Patient	Coagulation Time (min.)	
	Lee and White	Silicone Coated Tube
W. G.	8	46
M. H.	9	35
M. D. # 1*	6	24
M. D. # 2*	7	40
M. S. S.	7	30
M. E. H.	4, 7	29, 34
P. H.	6	35
G. H.	10	45
M. J. P.	4, 6.5	39, 30
F. S.	4, 7	28, 28
K. K.	8	45
J. A.	5	46
B. R.	8	45
B. J. R.	6	48
G. K.	7	34
W. L.	5	36
W. C. L.	5	32
H. M.	6	36
O. Z. G.	5	32
G. W. B.	6	22

*M. D. # 1 and M. D. # 2 are the same patients; two sets of studies were made.

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In other reports, which include patients with myocardial infarction or congestive heart failure, the complicating factors of bed rest, hemoconcentration following the administration of mercurials, and other influences favoring the development of thrombi were not excluded. In all instances digitalization was accomplished by the oral administration of 1.6 mg. of digitoxin in a twenty-four-hour period and maintained by the daily administration of 0.2 mg.

Coagulation Time.—Whole blood coagulation time tests were performed in triplicate using both the Lee and White method and the silicone coated tube method. These values were obtained on three successive days in 10 cases. Similar studies were performed on three successive days after digitalization of these patients.

Heparin Tolerance.—Heparin tolerance curves were determined 26 times in 11 patients according to the technique described by de Takats and others.[3] The method consists of obtaining capillary tube coagulation time values before and at 10, 20, 30, and 40 minutes following the intravenous administration of 10 mg. of heparin. These were repeated after digitalization.

Employing the Lee and White method for determination of coagulation times, 30 heparin tolerance curves were obtained in 11 patients before and after digitalization and in 4 cases repeated two weeks after digitoxin was discontinued. In this modification the coagulation time was obtained at 10 and 40-minute intervals following the intravenous administration of 10 mg. of heparin.

Prothrombin Activity.—Prothrombin activity was determined by a modified Quick one-stage method in 12 patients. These studies were repeated after digitalization. The patients were treated with Dicumarol in the usual fashion and the prothrombin activity was again determined.

Dicumarol was administered to 3 patients. After stabilization of the prothrombin activity by the administration of maintenance doses of Dicumarol, each of these patients was given digitalis according to the method previously described. Following digitalization the prothrombin activity was again determined.

RESULTS

Coagulation Time.—Table 1 compares coagulation times obtained using the Lee and White method with those similarly obtained in silicone coated tubes. It is apparent that the latter method is much more sensitive since the normal values are fourfold to sixfold greater when coagulation times are determined in silicone coated tubes than when determined in plain glass tubes.

The experimental data obtained in the coagulation time study are summarized in table 2. No significant alterations in coagulation time determined by either the usual method or the silicone coated tube method were observed after the patients were given digitoxin. Instances of minimal prolongation and of minimal

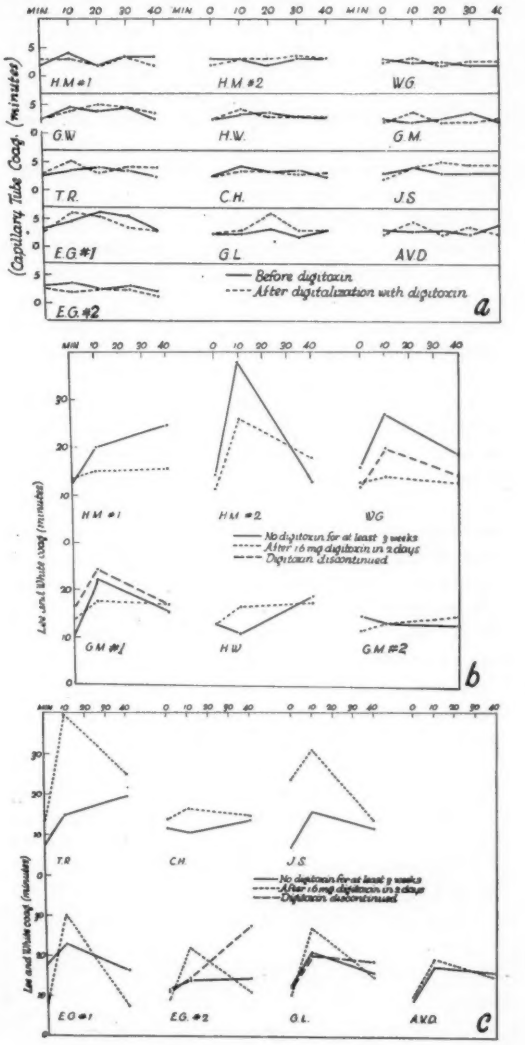

FIG. 1a. Heparin tolerance curves obtained before and during administration of digitoxin. These studies were made using the capillary tube method of determining coagulation time, and in each instance 10 mg. of heparin was administered intravenously at 0 minutes.

b. Heparin tolerance curves obtained before, during, and after administration of digitoxin showing a depressed response after digitalization. These studies were made using the Lee and White method of determining coagulation time.

c. Heparin tolerance curves obtained before, during, and after administration of digitoxin showing an exaggerated response after digitalization. These studies were made using the Lee and White method of determining coagulation time.

(Some patients were studied twice. Repetition of initials indicates repetition of the patient.)

TABLE 2.—*Effect of Digitoxin on Coagulation Times Determined by the Lee and White Method and with Silicone Coated Tubes.*

Patient	Coagulation Time (min.)															
	Before Digitoxin								After Digitoxin							
	1st Day		2nd Day		3rd Day		Average		1st Day		2nd Day		3rd Day		Average	
	LW	S	LW	S	LW	S	LW	S	LW	S	LW	S	LW	S	LW	S
M. F.	5	18	5.5	30	6	49	5.5	32.3	6	31	5.5	45	6	29	5.8	35
C. R.	5	23	7.5	44	7	31	6.5	32.6	7	41	6	30			6.5	35.5
R. B	5	26	5.5	32	5	44	5.1	34	6	54	8	63	6	32	6.6	49.3
F. M. C.	4	20	4	26	5	34	4.3	26.6	6	26	4	27	6	28	5.3	27
L. H.	5	16	7	33	6	34	6.0	27.6	6	23	7	32	4	37	5.6	30.6
J. B.	6	39	6	39	4	24	5.3	34	5	36	7	35	6	22	6.0	31
W. D. T.	6	44	7	36	7	28	6.6	36	4	31	7	37	5	26	5.3	31.3
J. T. L.	6	38	3	43	6	29	5.0	36.6	10	37	6	36	6	29	7.3	34
R. A.	5	40	5	42	7	24	5.6	35.3								
E. G. B.	7	41	4	69	4	30	5.0	46.6	10	29	8	35	5	40	7.6	34.6

LW=Lee and White method. S=Silicone coated tube method.

shortening are listed, but the changes are so slight that they are not significant.

Heparin Tolerance.—Figure 1a graphically summarizes heparin tolerance curves obtained by the method described by de Takats,[3] using the capillary tube coagulation time technique. Digitalization produced no significant changes in either absolute time values or patterns of response to injected heparin.

Since the capillary tube method for determining coagulation times is generally considered to be undependable, the heparin tolerance studies were repeated, using Lee and White coagulation time determinations prior to and at 10 and 40 minutes following the intravenous administration of 10 mg. of heparin. The results obtained again revealed no consistent alterations in response following digitalization. Figure 1b summarizes 6 experiments in which digitalization was followed by a depression of the response of the coagulation time to the administration of heparin. However, an entirely different effect is evident in Figure 1c, which demonstrates that in 7 instances digitalization was followed by an exaggerated response of coagulation time to the administration of heparin.

Prothrombin Activity.—Table 3 summarizes the effect of digitalization and of Dicumarol upon prothrombin activity. Digitalization did not produce any alteration of prothrombin activity in any of the 12 patients studied. Eight of the patients received 600 mg. of Dicumarol in three days. All but one (S. T.) of the patients showed the expected decrease in prothrombin activity despite digitalization. Four days after Dicumarol was discontinued the prothrombin activity was still significantly decreased even though digitalization had been maintained.

A reverse approach was used in 3 patients and the results are shown in table 4. Each patient was first given Dicumarol and the prothrombin activity was determined daily for several days. After stabilization at a therapeutic level was accomplished, each patient was given digitoxin orally over a two-day period. Following this, no change in the prothrombin activity was apparent. The Dicumarol effect was not dissipated in any case.

DISCUSSION

Thromboembolic disease frequently complicates illnesses in which digitalization is either absolutely or questionably indicated. It is natural, therefore, that effects of digitalis on the coagulation mechanism have been considered. As was pointed out in the introduction, the literature contains several suggestions, based upon experimental data as well as upon clinical impressions, that digitalis may increase the coagulability of the blood, and therefore may serve as a precipitating factor in the pathogenesis of thromboembolic disease. Such a problem deserves careful and critical evaluation, since its solution may influence important therapeutic decisions.

This study was planned to investigate the problem by several methods. The data presented represent

TABLE 3.—*Effect of Digitoxin and of Dicumarol upon Prothrombin Activity.*

Patient	Prothrombin Measurements					
	Control	Digitoxin*	Digitoxin Plus Dicumarol†		Dicumarol Discontinued‡	
	Time (sec.)	Time (sec.)	Time (sec.)	Activity (%) §	Time (sec.)	Activity %) §
M. G.	22	23	41	20	27	45
M. M.	21	21	37	25	26	45
P. W.	21	21				
Z. B.	21	21	60	15	24	60
D. H.	20	19				
O. D.	22	20	36	25	23	60
W. T.	21	22	55	15	30	35
G. B.	22	22	35	25	33	30
O. H.	21	22				
N. K.	19	20	30	20		
J. S.	21	22				
S. T.	18	18	21	60	26	30

*Tests made after 1.6 mg. of digitoxin was given in a two-day period and then 0.2 mg. was given daily thereafter.
†Tests made with a patient on digitoxin and after 600 mg. of Dicumarol was given in a three day period.
‡Tests made four days after Dicumarol was discontinued.
§Computed with a prothrombin time of 19 to 21 seconds as 100 per cent prothrombin activity.

TABLE 4.—*Prothrombin Activity After Digitalization of Patients Given Dicumarol.*

Day	Patient P. L. S.				Patient R. C.				Patient R. H.			
	Dicumarol (mg.)	Digitoxin (mg.)	Prothrombin Time (sec.)	Prothrombin Activity (%)*	Dicumarol (mg.)	Digitoxin (mg.)	Prothrombin Time (sec.)	Prothrombin Activity (%)*	Dicumarol (mg.)	Digitoxin (mg.)	Prothrombin Time (sec.)	Prothrombin Activity (%)*
1	300		19	100	300						20	100
2	200						21	80	300			
3	100				200				200			
4			55	10			21	80	100			
5			42	13	100						72	10
6	100		34	15	100		21	80			47	10
7	100		27	25	200		20	100	200		29	20
8	100		25	30	300		20	100			48	10
9	100		29	20	200		21	80			71	10
10	100		47	10	100		24	40			47	10
11	100	1.2	35	15	100		26	30	100	1.2	23	35
12	100	0.4	29	20	100				100	0.4	22	40
13	100		26	30	100	1.2	27	25			28	25
14					100	0.4	29	20				
15					100		30	20				

*Computed with a prothrombin time of 19 to 21 seconds as 100% prothrombin activity.

studies of coagulation time, physiologic responses to heparin, and prothrombin activity per se as well as alterations in prothrombin activity induced by Dicumarol. Digitoxin produced no consistent, significant alterations of the coagulation mechanism as demonstrated by any of the methods used. It is possible for alterations of blood coagulability to exist without producing overt evidence of such changes in any of the factors presented here, but until such changes can be demonstrated objectively, they must be regarded as being speculative.

On the basis of these considerations, these data indicate that digitoxin has no demonstrable effect on coagulation mechanism. Digitalization, therefore, is not contraindicated by either the threat or the presence of thromboembolic disease.

SUMMARY

Digitoxin was demonstrated to produce no significant alteration of the coagulation time, heparin tolerance or prothrombin activity nor to modify the effect of Dicumarol on prothrombin activity. The threat or the presence of thromboembolic disease does not contraindicate the judicious administration of digitalis.

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ABSTRACT OF DISCUSSION

DR. O. B. GOBER, Temple: I have been somewhat confused as to whether digitalis should be used in the presence of anticoagulants, especially since many reports have indicated that the effect of digitalis was to promote increased coagulability and that the dangers associated with this result might prove detrimental to the patient. Although I have felt that digitalis was not contraindicated in the presence of anticoagulants, especially if the patient were decompensated, there was no definite clinical proof such as Dr. Levin and Dr. Ruskin have presented. The fact that the essayists have shown that digitalis can be used in conjunction with anticoagulants without fear of increased danger to the patient means that one more problem has been removed in the proper treatment of patients having decompensation.

The diagnosis of tuberculosis has such dreadful implications to many patients that its pronouncement by their doctor often causes serious emotional reactions. Some patients fail to hear or comprehend the explanations and instructions that follow the statement of diagnosis, some patients show deep resentment or refuse to accept the diagnosis, while others concentrate on the serious problems they must face in order to undergo treatment.—G. Canby Robinson, M. D., Bull. Johns Hopkins Hosp., April, 1951.

The American Pharmaceutical Association will celebrate its centennial anniversary during October. Established October 7, 1852, in Philadelphia, the association has planned several special celebrations. The centennial convention is being held the week of August 17 in Philadelphia, and Founders' Day meetings will be held simultaneously throughout the nation on October 7. The week of October 5 has been designated as National Pharmacy Week.—News Bulletin, Texas Pharmaceutical Association, May, 1952.

SOME CONSIDERATIONS OF THE USE OF ANTIBIOTIC AGENTS

HENRY M. WINANS, M.D., Dallas, Texas

IN 1945 Waksman defined an antibiotic substance as "a chemical substance, of microbial origin, that possesses antibiotic powers." An antibiotic power may be defined as the means by which one form of life destroys another to preserve its own.

As our knowledge of these substances increases, it becomes apparent that we should not limit our conception of them too narrowly as being only a means of treating disease. It is likely that the antibiotic substances in nature provide a means of maintaining the biologic balance. That this carries over in its therapeutic use may be seen in the fact that the administration of an antibiotic agent against one type of organism frequently allows an overgrowth of another type, sometimes with undesirable effects. Another point of interest about them is their reaction to the growth factor in animal dietary. Practically all of them when added to food in amounts far below any antibacterial effect produce increased growth in nearly all animals. The effect of this characteristic upon the human being cannot be appraised.

A further consideration of the use of antibiotic drugs in treatment brings up the important consideration as to whether they may not accelerate the evolution of both bacteria and viruses. It is well known that certain organisms may develop resistance to antibiotic agents and thus evolve a new definite strain. Of equal importance is the possibility that by controlling certain pyogenic infections, the adaptation of viruses formerly limited to lower animals may be facilitated for humans. As yet the exact mode of action of antibiotic drugs has not been determined. Some of them appear to be bactericidal, others seem to have only an inhibiting effect. At present, both of these actions appear to be concerned with the enzyme systems.

It is interesting to consider the revolutionary effect which the introduction of antibiotic substances has made in the general aspect of medical practice. Pneumonococcal pneumonia, which in the early 1930's seemed to be increasing in frequency and virulence, forms an insignificant number of infections today. Whether the result altogether of antibiotic agents or not, the gross mortality from appendicitis has dropped from about 8 to 3 per cent. A still greater drop in the incidence and mortality from meningococcal meningitis has been effected.

The complete change of picture in both the prophylaxis and treatment of venereal diseases is perhaps one of the most startling effects of all. It would be impossible to list all of the more minor conditions now easily dealt with. However, it is probably of note that even one of the most annoying and resistant of all, pinworm infestation, apparently can be controlled by the use of terramycin base.

While considering the many advantages resulting from the use of antibiotic agents, it is necessary to take into account some of the serious disadvantages which have developed. First is the effect upon the public in general. The great publicity given to the so-called "miracle drugs" has led some of the public to expect early relief for any kind of an infection, including all those for which as yet there are no successful therapeutic substances. It has even had the effect of developing a tendency on the part of patients for by-passing the doctor. Scarcely a day goes by that someone does not call my office and want to run in for a "shot" of penicillin, regardless of what his condition may be.

On the part of the physician there is a tendency toward poorer diagnoses: Patients with infections frequently are given not only one but several antibiotic agents with the idea of ending the condition before it is known what type of infection is present. Sometimes this type of therapy is a corollary to treating patients without examination, or frequently without ever seeing them. There is not enough care taken in deciding which antibiotic agent should be used, and many physicians resort to the use of one, two, three, or more at the same time, apparently in the hope that one of them will effect a cure.

While it is true that in a few instances there is synergism between two of the substances, it is equally true that there is antagonism, especially between penicillin and Aureomycin and Chloromycetin. This was demonstrated first in the test tube, but has recently been corroborated by animal experiments. Perhaps it is asking too much to expect that in every instance organisms will be recovered and their sensitivity to the various antibiotic agents determined, but at least this should be the ideal toward which the profession works.

There are several improper uses of the antibiotic drugs which are quite general. One is the giving of penicillin by injection, when in many instances it is unnecessary. Its use in this way increases the chances of sensitivity reactions or the development of a sensitization. Whenever possible the antibiotic substance should be given by mouth. It has also been demon-

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strated that Aureomycin, terramycin, and to a lesser extent Chloromycetin, may produce liver damage when given intravenously. The local use of antibiotic agents in solution or in ointments may also produce sensitivity either local or systemic. This sensitization is most common in the antibiotic drugs which may be taken hypodermically or by mouth and least common with those which cannot be used in this manner.

SUMMARY

If antibiotic substances are to be used properly, it will be necessary for the medical profession to educate the public. It should be made clear what may and may not be accomplished by this treatment. The tendency toward diminished diagnostic efforts and to omission of careful physical examination must be combatted. Furthermore, recovery and identification of the invading organism together with evaluation of its sensitivity to the various antibiotic substances should be applied whenever possible. This will lead to the use of the proper antibiotic drug and discourage indiscriminate and unnecessary administration. When possible, hypodermic administration and topical application of antibiotic agents known to cause local or constitutional sensitization should be avoided. In many instances, the expense of treatment is considerably increased and the possibility of antagonism developed by multiple administration. Finally, in view of the possibility of developing resistance, only the amount of an antibiotic drug necessary for control of the disease should be given. Resistance of bacteria in the body has not been demonstrated for all of the antibiotic substances although it is likely that it may develop. However, beyond that is the fact that many bacteria relatively unaffected by any of the antibiotic agents, especially certain gram-negative bacilli and monilia, may have their growth accelerated and lead to an infection difficult to control.

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ABSTRACT OF DISCUSSION

DR. JABEZ GALT, Dallas: In 1949 I was once again made keenly aware that there is no drug or medication at our disposal that is without some potentially undesirable action. Aureomycin, then a relatively new antibiotic drug endowed with the "miracle status," proved its conformity to pattern when it was given to a febrile patient empirically after all diagnostic efforts had failed.

While this patient was receiving Aureomycin, the course of the illness indicated the need for liver function tests. The results of the determination of urobilinogen in the stool, bile in the urine, and bilirubin in blood serum were incompatible with the well established concepts of bile pigment formation, transport, and excretion. Although the urobilinogen determination in the stool was negative, urobilinogen was present in the urine but not increased; serum bilirubin was normal and urine bilirubin was negative. The cephalin flocculation test was 4 plus. As the persistent absence of urobilinogen from the stool would imply exclusion of bilirubin from the intestinal tract by extrahepatic obstruction, an experiment was done to see whether or not the use of Aureomycin could be responsible for the unusual laboratory findings.

A group of five doctors had control studies made on themselves of the above stool, blood, and urine tests for three days. Then we took 2 Gm. of Aureomycin per day and performed all tests daily for two weeks. After four days of administering the antibiotic substance, the stool urobilinogen was negative in all subjects and the bile content was increased. In summary, the results on us were the same as on the patient except for the cephalin flocculation tests remaining negative. We believe this to be due not to oral Aureomycin damaging the liver, but to a decrease in bacteria in the intestine so that urobilinogen is not synthesized.

The experiment was duplicated using Chloromycetin and no changes were produced. Our conclusion was that the use of Aureomycin would add to the difficulties in the differential diagnosis of the cause of jaundice and of hepatitis with jaundice. Chloromycetin does not have this property.

I wonder if we would not be guided better in antibiotic therapy if we mentally referred to the laboratory "sensitivity" tests as laboratory "susceptibility" tests instead. The popular disk technique for evaluating sensitivity of an organism is highly inexact. It is fortunately of great value in determining whether or not there is any susceptibility of an organism to a given antibiotic agent. All of us have seen excellent therapeutic responses when the disk sensitivity tests showed little activity. It is likely that present studies will make the tests of greater clinical accuracy.

The matter of synergism and antagonism is fascinating. We cannot yet know the full significance of recent findings in this area, but they may alter our therapy in time. At present it is proved that the antibiotic drugs fall into two groups—bacteriostatic and bacteriocidal. Aureomycin, Chloromycetin, and terramycin fall into the bacteriostatic group, and penicillin and streptomycin into the bacteriocidal. Action of the second group is impaired by the first group in certain dosage schedules.

Ironically, in all of the severe reactions to antibiotic substances that I have personally handled, in only 1 case was there a clean-cut indication for the use of such an agent to start with! In the 1 case of severe reaction that I caused by giving penicillin to a demanding, insecure patient with nasal stuffiness, I felt so remorseful that in the end it cost me 20 cc. of cortisone and many house calls.

A specific substance to work against radiation poisoning has been discovered, according to Dr. Shields Warren, director of the Atomic Energy Commission's Division of Biology and Medicine. It has been determined that an emulsion of bone marrow will protect experimental animals against radiation, and it is the hope of researchers that a specific chemical substance can be developed from this lead.

Deaths from diseases of the heart, arteries and kidneys are 50 per cent (men) to 77 per cent (women) commoner among the obese; cerebral hemorrhage increases 60 per cent above the normal; and death from diabetes goes up almost 300 per cent, according to Louis I. Dublin, top statistician for the Metropolitan Life Insurance Company.—Time, June 23, 1952.

TELEPAQUE AND PRIODAX, GALLBLADDER MEDIA
A Comparative Study

OTTO H. GRUNOW, M.D., Fort Worth, Texas

TELEPAQUE, a new cholecystographic medium has been available for experimental purposes the past year. During this time articles have been written by Dunne, Jensen, and Hughes[5]; Scott and Simril[16]; Christensen and Sosman[2]; and Morgan and Stewart.[15] All agree that the drug produces denser shadows and fewer side reactions than Priodax, that a smaller dose might be used, that small stones might be obscured, and that unabsorbed material frequently is found within the colon.

The Department of Radiology at Harris Clinic has received a supply of Telepaque from Winthrop Stearns, Inc., for investigation. It has been given to 128 patients, and our experiences are herewith reported. Also, comparisons are made of (1) the side reactions of Telepaque and Priodax, (2) the effect the media have upon the urinary tract, and (3) the density of the radiographic shadows they produce.

PREVIOUS INVESTIGATIONS

Radiographic visualization involving an excretory or concentrative process is unique in the study of organic function. In spite of numerous attempts, only three organic systems so far have yielded successful visualization. The gallbladder examination was developed first. Demonstration of the liver and spleen by the potentially dangerous thorium sol and examination of the urinary tract by water-soluble organic iodine solutions came later.

Early Cholecystopaques

Well acquainted as they were with liver function tests and the works of Abel and Rowntree[1] regarding the absorption and excretion of phenolphthalein compounds, Graham and Cole[9] in 1924 reasoned that if the chlorine in tetrachlorphenolphthalein, already used in liver function tests, were replaced by iodine the drug might cast an x-ray shadow during its stay within the gallbladder. In this reasoning they were proved correct, although the initial supply of tetraiodophenolphthalein was too toxic and was abandoned for tetrabromphenolphthalein. For years the purified compound tetraiodophenolphthalein and its isomer phenoltetraiodophthalein were the only accepted cholecystopaques.

Valuable as the examination was, the side effects produced by the harsh, nauseating metallic taste of the medium were disconcerting. Vomiting and diarrhea occurred frequently, and attempts to control these untoward effects were not successful.

Although new substances were investigated, none was clinically promoted until 1940, when the German literature[4, 14] described the clinical investigation of a medium called Biliselectan. Two years later it was studied in this country as iodoalphionic acid with the trade names of Priodax, Pheniodol, and Dikol. Side reactions, although greatly reduced, were still prominent and further investigative work was indicated. A series of proposed cholecystopaques was methodically studied in 1946 by Epstein, Natelson, and Kramer[6] and from this study eventually resulted the drug Monophen. Clinical reactions of this medium were reported in July, 1951, by Wasch and Epstein.[17] In the meantime the German and Italian literature also had mentioned Jodobil, which appears to have been similar to Priodax in its properties.[7]

Telepaque

The drug Telepaque, a recent development, compares favorably with the criteria advanced by Epstein, Natelson, and Kramer. These investigators believed that a cholecystopaque should be phenolic and fat soluble to reach and pass through the liver, should have a carboxyl group for solution in bile, should contain sufficient iodine to be opaque, and should be relatively free from phenol groups which require detoxification. A comparison of the molecular structures of the cholecystopaques will show that Telepaque holds a favorable position, according to the previously named criteria (fig. 1).

Telepaque is a cream colored solid, which is in-

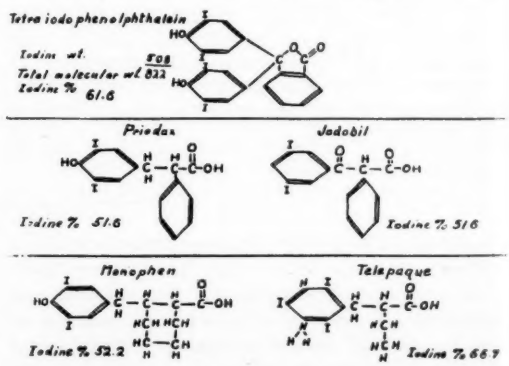

FIG. 1. A comparison of the molecular structures of the common gallbladder media and the percentages of iodine contained in each.

Read before the Section on Radiology, Texas Medical Association, Annual Session, Dallas, May 6, 1952.

soluble in water but soluble in dilute alkaline and organic solvents. This indicates that it should be absorbed in the small bowel. It comes in .5 Gm. tablets. Studies indicated that the radiopacity of the gallbladder with administration of the medium in cats was comparable to that produced by iodoalphionic acid; in dogs, a more brilliant shadow was produced.

Toxicity studies with mice indicated that intravenously the medial lethal dose of Telepaque is 360 mg. per kilogram of body weight. Iodoalphionic acid is somewhat less toxic in that the medial lethal dose is 400 mg. per kilogram. Oral toxicity tests, however, showed that Telepaque is one-fourth as toxic (medial lethal dose 16 Gm. per kilogram) as iodoalphionic acid (medial lethal dose 4 Gm. per kilogram). Oral doses of 1 Gm. per kilogram of body weight in dogs produced no gastrointestinal irritation, hepatic or renal impairment, and no pathologic lesions upon microscopic examination at autopsy. [8, 10, 11]

The administration of Telepaque to human beings is similar to that of Priodax in that the tablets are swallowed with water after a fat-free evening meal. Since the literature indicated that the highest concentration would be present in the gallbladder in from ten to twelve hours, the tablets were given to our patients at 11 p.m. instead of at 6 p.m.

PRESENT STUDIES

No selection was made from the patients reporting for gallbladder studies. Alternate patients received 3 Gm. of Priodax, the others 3 Gm. of Telepaque, until 61 patients had received Priodax and 61 Telepaque. Thereafter, 67 consecutive patients received Telepaque, making a total of 128 who had received the new drug. Seventy-six of the group received 3 Gm. of Telepaque, 26 a variable dose depending upon their weight, and the remaining 26 patients 2 Gm. regardless of weight. A form listing a series of specific side effects, the results of a urinalysis, and the radiographic evaluation was completed for each patient. All questioning was done by the same group of workers to assure uniformity. Queries requested specific reports regarding diarrhea, dysuria, nausea, vomiting, pyrosis, headache, and flushing.

Side Reactions

The side effects observed in our patients who received Priodax and those observed by and collected by Collins and Golden[8] are compared in table 1. The morbidity in our series was somewhat higher on the whole than in the others. A simple explanation cannot be made; it is possible that our questions were too direct and suggestive.

Diarrhea, which was interpreted as being any loose stool, was from 1.25 to 4 times more frequent in our study. The incidence of dysuria was from 2 to 6 times higher; it was common, particularly among males, and was explained on the basis of the irrita-

TABLE 1.—*Comparison of Side Effects Observed in 61 Patients Receiving 3 Gm. of Priodax with Those Recorded in the Literature and with Those in 128 Patients Receiving from 2 to 3 Gm. of Telepaque.*

Symptom	Priodax		Telepaque
	Collins & Golden (%)	Harris Clinic (%)	Harris Clinic (%)
None	...	20	44
Diarrhea	11-33	46	18
Dysuria	5-15	30	20
Nausea	8-28	25	10
Vomiting	1-10	2	1
Pyrosis	....	25	12
Headache	....	26	11
Flushing	....	3	13
Other*	....	5	9

*Includes dizziness, faintness, stomach cramps, stomach distress similar to "gallbladder colic," numbness and restlessness, palpitation of the heart, tightness about the chest, "bleeding on urination" (negative on urinalysis), bad taste in the mouth, and burning of the rectum.

tion the drug produced during micturition. Male patients were thought to be more susceptible because of the greater length of the urethra. Of the 30 per cent of patients who experienced this symptom 55 per cent were males and 17 per cent females.

TABLE 2.—*Comparison of the Side Effects of Telepaque Observed at Harris Clinic with Published Reports.*

Symptom	Dunne, Jensen and Hughes (%)	Christensen and Sosman (%)	Harris Clinic (%)
Diarrhea	12	8	18
Dysuria	1	0	20
Nausea	9	10	10
Vomiting	0	0	1

The incidence of nausea and vomiting observed at Harris Clinic compared favorably with that in the literature. Pyrosis was included since it was believed the symptom might give further indication of gastric irritation. Its incidence was equal to that of nausea. In our study flushing and headaches were recorded

TABLE 3.—*Comparison of Urinary Findings Among Males and Females Receiving Telepaque and Priodax at Harris Clinic.*

Cholecystopaque	Males %		Females %	
	Cells	Albumin	Cells	Albumin
Priodax, 3 Gm.	35	35	65	46
Telepaque, 3 Gm.	42	38	53	23
Telepaque, 2 Gm.	78	22	100	0
Telepaque, variable dose	27	36	47	28

in the hope that these symptoms might give an insight into vasomotor stability, but the observation of headache is difficult to evaluate since its incidence was not consistent.

Reactions seen in our patients receiving Priodax and in those who were given Telepaque are com-

pared in table 1. Twice as many patients getting Telepaque were free from reaction as those who took Priodax. Moreover, there was a decrease in the incidence of all categories of symptoms except flushing and the miscellaneous item. The increase in flushing is hard to explain and may suggest some vasomotor instability. The difference in the incidence of vomiting is not significant since the results were compatible with chance.

A comparison of the incidence of side effects in the group of patients receiving Telepaque whom we observed with reports of others (table 2) indicates that the morbidity in our group was again somewhat higher.

Diarrhea observed by us was from 1.5 to 2 times more frequent and dysuria 20 times more frequent. Of patients with the latter complaint 28 per cent were males and 18 per cent females.

Urinalysis

Since a considerable amount of Priodax is excreted through the kidneys[13] and the exact method whereby Telepaque is eliminated is not definitely known, it was believed that urinalysis might give some indication of the effect of the latter medium upon the kidneys.

Three substances were specifically sought: red or white blood cells, albumin, and casts. Since the patients were not selected, some undoubtedly were suffering from prostatism, kidney and bladder infections, and the like. Urinary samples from female patients were voided specimens; consequently, any findings to be considered significant would have to be consistent and of considerable degree. In table 3 the abnormal urinary findings in patients receiving Telepaque and Priodax are recorded, even if only the faintest trace of albumin or a single cell were present. In the main, abnormal findings were minor. According to a recent note in *The Journal of the American Medical Association,*[12] Priodax causes a transient albuminuria; the source material was not mentioned.

Casts were observed in urinary specimens of only 3 per cent of those receiving Priodax and in only 7 per cent of those receiving Telepaque. These observations are well within the limits of chance in a group of persons who would seek medical aid. The random occurrence of the abnormal urinary findings and the lack of correlation with side effects, quantity and type of medium ingested, sex, or radiographic findings lead me to believe that the observations in table 3 are not the result of either cholecystopaque.

Radiographic Visualization

A prime requisite of a cholecystopaque is its power to produce opaqueness. The original tetrabromphenolphthalein was discarded by Graham and Cole in favor of the same molecule containing iodine because the necessarily high dosage of the former drug caused more toxic manifestations. The four atoms of iodine in tetraiodophenolphthalein represented 61.6 per cent of the molecular weight. Shadows for the most part were excellent if the material was adequately absorbed. Priodax has two atoms of iodine constituting only 51.4 per cent of the molecule. We became reconciled to the decrease in density because it was offset by a decrease in side effects and an absence of unabsorbed material in the colon. Telepaque contains three atoms of iodine representing 66.7 per cent of the molecular weight; therefore, it should cast a deeper shadow. Our observations are in accord with this reasoning. Technically Morgan and Stewart[15] confirmed this assumption by densitometric studies of their cases.

TABLE 4.—*Degree of Density of the Shadow of the Gallbladder Observed with Priodax and Telepaque.*

Density	Priodax %	Telepaque %
Unusually brilliant	15	33
Average	69	48
Subaverage	11	11
Faint without definite outline	2	2
Not visualized	3	6

An examination of table 4 reveals how the densities were segregated. The designations are subjective and were based on a shadow of the gallbladder produced by Priodax which we had commonly seen and accepted as average (fig. 2).

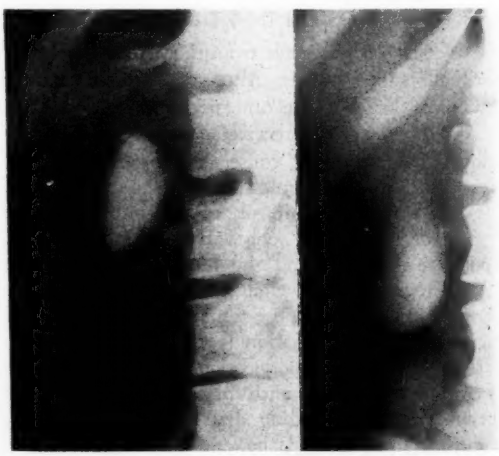

FIG. 2. Comparison of a brilliant gallbladder shadow produced by Telepaque (left) with an average shadow produced by Priodax (right).

The added brilliance obtained with Telepaque may be useful in decreasing the quantity of the drug required. Forty-eight patients received 2 Gm. instead

of 3. In this group there was no difference in the number of side effects or any material change in the density of shadows. At present we are running a series in which patients are receiving only 1.5 Gm. rather than 3.*

A possible objection to Telepaque suggested by Christensen and Sosman is that the brilliance might obscure stones; this difficulty was not experienced

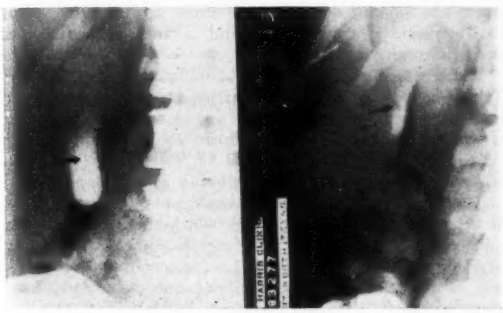

FIG. 3. A small radiolucent stone in a brilliant shadow produced by Telepaque. The radiograph on the left was taken before a fatty meal and the one on the right after a fatty meal.

in our studies. At no time was the opacity so great that the shadows of the overlying structures were completely hidden. This is demonstrated in the view of a small radiolucent stone in the brilliant shadow of the gallbladder (fig. 3). Theoretically, with the use of higher kilovoltages there should be less absorption. The possibility of hiding a stone should become less likely.

A disturbing finding in the examination is the presence of unabsorbed material within the colon (fig 4), which occurred in 60 per cent of those receiving Telepaque but in only 3 per cent of those receiving Priodax. A review of the possible situations in which the medium might be objectionable reveals that in one-eighth of the cases unabsorbed material in the colon could have hindered diagnosis. Generally the use of different positions overcome this difficulty. Our patients are instructed to take an enema of 4 pints of water prior to examination with the hope that the major portion of the medium might be expelled; results are variable.

Administration of the dye two hours earlier (9 p. m. instead of 11 p. m.) had no apparent effect upon the density of the shadow. Unfortunately, those gallbladders not initially visualized were not studied further by change of medium or dosage.

*In 17 patients receiving only 1.5 Gm. of Telepaque 1 had a subnormal shadow, 9 had average shadows, and 7 had superior shadows. This would imply that 1.5 Gm., one-half of the recommended dose, would be satisfactory for the average patient.

FIG. 4. A roentgenogram showing residual Telepaque in the colon overlying a portion of the gallbladder.

CONCLUSIONS

A new opaque medium for gallbladder studies, Telepaque, follows closely the criteria set forth by Epstein, Natelson, and Kramer in that it has a simpler molecular structure than other media, is free from toxic phenol groups, and contains a higher iodine content than do other media. The drug has been given to 128 patients at Harris Clinic in whom the side effects of nausea, vomiting, diarrhea, dysuria, headache, and pyrosis were observed to have decreased approximately 50 per cent when compared with the series of patients receiving Priodax.

Urinalysis of patients receiving Telepaque indicated that no consistent urinary disturbance can be ascribed to the drug.

Telepaque consistently produced more brilliant gallbladder images on cholecystograms than Priodax. The presence of the unabsorbed drug in the colon is disturbing but has not necessarily decreased its diagnostic value. A decrease in the recommended dosage from 3 to 2 Gm. is warranted and produces only minor changes in the number of symptoms and the brilliance of the gallbladder's shadow.

I would like to acknowledge with gratitude the comments, suggestions, and advice given by Dr. R. P. O'Bannon and the consistently willing help given by Mrs. Helen Russell, Mrs. Charlene Stagg, Mrs. Zena Massey, and Miss Elaine Weaver, members of the technical staff of Harris Clinic, who helped collect the material for this paper.

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650 Fifth Avenue, Fort Worth 4.

ABSTRACT OF DISCUSSION

DR. JOHN J. SAZAMA, JR., Dallas: After being invited to discuss Dr. Grunow's paper, I used Telepaque on 30 patients. In this small series the results in percentages of better visualization were in approximate accord with the figures given by Dr. Grunow. No patients had significant ill effects from the dye.

A questionnaire was not used; the method was a typewritten note attached to each package of Telepaque going to a ward. The nurse was advised that the results in the particular cholecystogram were to be the subject of discussion, was given instructions as to the administration of the dye, and finally was asked to report any ill side effects such as nausea or diarrhea. None were reported. At the beginning of the series, roentgen examinations were being made fifteen hours after the oral ingestion of the dye; this had been the time for the cholecystopaque used formerly and was in accordance with the printed instructions on the package of Telepaque. Frankly, results with this time interval were no better (perhaps in a few cases slightly better) than with the dye used formerly. After reading Dr. Grunow's paper and reviewing reports on the work of others, I shortened the interval to twelve hours, and results were much better

In the last few cases I also reduced the dose, as Dr. Grunow did, to 2 Gm. with no perceptible change in results and with less residual dye in the gastrointestinal tract. The amount of dye in the small bowel with 3 Gm. of Telepaque is considerable, and at times objectionable, as Dr. Grunow mentioned.

There was 1 case in which administration of 3 Gm. of Telepaque did not result in visualization of the gallbladder shadow. The examination was repeated with a double dose of another popular dye, still with no visualization. A third examination with a double dose of Telepaque (6 Gm.), however, showed a normal functioning gallbladder.

The results of Dr. Grunow's work, as well as the results of others, pose several problems which might suggest the subjects of future papers. For example, other investigators have agreed that there is a higher percentage of visualization of the gallbladder using Telepaque. Therefore, have errors occurred in the diagnosis of gallbladder disease because of what actually might have been an inadequate cholecystopaque? It would be well to study the findings at surgery or autopsy after nonvisualization of the gallbladder in a series of cases using Telepaque and in an accompanying series using one of the older, more popular dyes.

The work of Scott and Simril[16] last year showed that in all except 1 case in a small series adequate visualization of the gallbladder was obtained from four to six hours after ingestion of Telepaque. Is it a dye that eliminates the two-day procedure? Such encouraging results surely warrant further investigation with a larger number of cases. In 1 of my cases roentgen examinations were made beginning one hour after the ingestion of the tablets (2 Gm.) and adequate visualization was obtained from the first examination.

Finally, in Telepaque might be found a more economical cholecystopaque. Although I understand that the cost of the pack of 6 tablets is approximately the same as the other gallbladder dyes on the market, Dr. Grunow has shown that for the average patient only 2 Gm., or 4 tablets, is necessary. Scott and Simril[16] also noted adequate visualization using 2 Gm. of dye for patients weighing up to 150 pounds. Christensen and Sosman[2] reported similar results; therefore, it might be assumed that adequate examination can be performed with less than the complete pack of 6 tablets. This assumption, however, also warrants further substantiation.

Radioactive Cortisone Made Available for Research

Radioactive cortisone for use in medical research will be manufactured with the aid of funds from the National Institute of Arthritis and Metabolic Diseases, Dr. Russell M. Wilder, director of the institute, has announced.

"Radiocortisone will be a valuable tool for scientists, particularly those studying arthritis and the various metabolic diseases involving adrenal gland hormones. Further knowledge of these hormones might benefit the 7,500,000 Americans who suffer from rheumatic disease," Dr. Wilder said.

Radioactive cortisone has not been produced in sufficient quantity for research studies. The product will contain radioactive carbon to "tag" the cortisone so that it can be traced through the bodies of experimental animals to learn how it produces its effects in health and disease.

A fund of $66,000 will be administered by a small committee of scientists from nonfederal research institutions. The committee will distribute the product to qualified scientists who submit formal research proposals to the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md.

NEWS

COMING MEETINGS AND CLINICS

Texas Medical Association, Houston, April 28-29, 1953. Dr. T. C. Terrell, Fort Worth, Pres.; Mr. N. C. Forrester, 700 Guadalupe St., Austin, Executive Secy.

American Medical Association, Denver, Dec. 2-5, 1952. Dr. Louis H. Bauer, Hempstead, N. Y., Pres.; Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secy.

NATIONAL AND REGIONAL

American Academy of Allergy. Dr. Walter S. Burrage, Milwaukee, Pres.; Mr. James O. Kelley, 208 E. Wisconsin Ave., Milwaukee 2, Executive Secy.

American Academy of Dermatology and Syphilology. Dr. Donald M. Pillsbury, Philadelphia, Pres.; Dr. John E. Rauschkolb, 25 Prospect Ave., N. W., Cleveland 15, Secy.

American Academy of General Practice, St. Louis, March 23-26, 1953. Dr. R. B. Robins, Camden, Ark., Pres.; Mr. Mac F. Cahal, 406 W. 34th St., Kansas City 2, Executive Secy.

American Academy of Neurological Surgery, New York, October, 1952. Dr. Henry G. Schwartz, St. Louis, Pres.; Dr. Theodore B. Rasmussen, 950 E. 59th St., Chicago 37, Secy.

American Academy of Obstetrics and Gynecology, Chicago, Dec. 15-17, 1952. Dr. Carl P. Huber, Indianapolis, Pres.; Dr. Ralph A. Reis, 116 S. Michigan Ave., Chicago 3, Secy.

American Academy of Ophthalmology and Otolaryngology, Chicago, Oct. 12-17, 1952. Dr. J. Milton Robb, Detroit, Pres.; Dr. W. L. Benedict, 100 First Ave. Bldg., Rochester, Minn., Secy.

American Academy of Pediatrics, Chicago, Oct. 20-23, 1952. Dr. W. W. Quillian, Miami 34, Pres.; Dr. E. H. Christopherson, 610 Church St., Evanston, Ill., Secy.

American Association for Thoracic Surgery, San Francisco, March 27-30, 1953. Dr. Robert M. Janes, Toronto, Canada, Pres.; Dr. Paul C. Samson, 2938 McClure St., Oakland 9, Calif., Secy.

American Association of Genito-Urinary Surgeons, Hot Springs, Va., May 6-8, 1953. Dr. A. J. Scholl, Los Angeles, Pres.; Dr. Norris J. Heckel, 122 S. Michigan Ave., Chicago 3, Secy.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Hot Springs, Va., Sept. 4-6, 1952. Dr. Leroy A. Calkins, Kansas City, Pres.; Dr. William F. Mengert, 2211 Oak Lawn Ave., Dallas, Secy.

American Cancer Society. Dr. Guy Aud, Louisville, Ky., Pres.; Mr. M. R. Runyon, 47 Beaver St., New York, Exec. Vice-Pres.

American College of Allergists. Dr. J. Warrick Thomas, Richmond, Va., Pres.; Dr. Fred W. Wittich, 423 La Salle Medical Bldg., Minneapolis 2, Secy.

American College of Chest Physicians, New York, May 28-31, 1953. Dr. Andrew L. Banyai, Milwaukee, Pres.; Mr. Murray Kornfield, 112 E. Chestnut St., Chicago 11, Exec. Secy.

American College of Physicians, Atlantic City, April 13-17, 1953. Dr. T. Grier Miller, Philadelphia, Pres.; Mr. E. R. Loveland, 4200 Pine St., Philadelphia 4, Secy.

American College of Radiology, Chicago, February, 1953. Dr. John S. Bouslog, Denver, Pres.; Mr. W. C. Stronach, 20 N. Wacker Drive, Chicago 6, Executive Secy.

American College of Surgeons, New York, Sept. 22-26, 1952. Dr. Alton Ochsner, New Orleans, Pres.; Dr. Michael L. Mason, 40 E. Erie St., Chicago 11, Secy.

American Congress of Physical Medicine, New York, Aug. 25-30, 1952. Dr. Robert L. Bennett, Warm Springs, Ga., Pres.; Dr. Frances Baker, 1 Tilton Ave., San Mateo, Calif., Secy.

American Dermatological Association. Dr. Earl D. Osborne, Buffalo, Pres.; Dr. L. A. Brunsting, 102 2nd Ave., S. W., Rochester, Minn., Secy.

American Gastro-Enterological Association, Atlantic City, May 1-2, 1953. Dr. Albert M. Snell, Palo Alto, Calif., Pres.; Dr. H. Marvin Pollard, 1313 E. Ann St., Ann Arbor, Mich., Secy.

American Gynecological Society. Dr. William P. Healy, New York, Pres.; Dr. John I. Brewer, 104 S. Michigan Ave., Chicago, Secy.

American Hospital Association, Philadelphia, Sept. 15-18, 1952. Dr. Anthony J. J. Rourke, San Francisco, Pres.; Mr. George P. Bugbee, 18 E. Division St., Chicago, Executive Secy.

American Laryngological, Rhinological, and Otological Society, New Orleans, April 28-30, 1953. Dr. Francis E. Le Jeune, New Orleans, Pres.; Dr. C. S. Nash, 277 Alexander St., Rochester 7, N. Y., Secy.

American Neurological Association, Atlantic City, June 15-17, 1953. Dr. Hans H. Reese, Madison, Wis., Pres.; Dr. H. Houston Merritt, 710 W. 168th St., New York 32, Secy.

American Ophthalmological Society, Hot Springs, Va., May 28-30, 1953. Dr. Conrad Berens, New York, Pres.; Dr. M. C. Wheeler, 30 W. 59th St., New York 19, Secy.

American Orthopedic Association. Dr. Fremont Chandler, Chicago, Pres.; Dr. C. Leslie Mitchell, Henry Ford Hospital, Detroit 2, Secy.

American Pediatric Society, Atlantic City, May 6-8, 1953. Dr. Irvine McQuarrie, Minneapolis, Pres.; Dr. Aims McGuinness, 237 Medical Laboratory, University of Pennsylvania, Philadelphia 46, Secy.

American Proctologic Society, Boston, June 10-13, 1953. Dr. Newton D. Smith, Rochester, Minn., Pres.; Dr. Stuart T. Ross, 131 Fulton Ave., Hempstead, N. Y., Secy.

American Psychiatric Association, Los Angeles, May 4-9, 1953. Dr. D. Ewen Cameron, Montreal, Canada, Pres.; Dr. R. Finley Gayle, 6300 Three Chopt Rd., Richmond 21, Va., Secy.

American Public Health Association, Cleveland, Oct. 20-24, 1952. Dr. Gaylord W. Anderson, Minneapolis, Pres.; Dr. R. W. Atwater, 1790 Broadway, New York 19, Exec. Secy.

American Society of Anesthesiologists, Philadelphia, Nov. 11-14, 1952. Dr. C. Walter Metz, Denver, Pres.; Dr. J. E. Remlinger, Jr., 188 W. Randolph St., Chicago, Secy.

American Society of Clinical Pathologists, Chicago, Oct. 13-18, 1952. Dr. Israel Davidsohn, Chicago, Pres.; Dr. Clyde G. Culbertson, Indiana University School of Medicine, Indianapolis, Secy.

American Surgical Association, Los Angeles, April 1-3, 1953. Dr. Robert S. Dinsmore, Cleveland, Pres.; Dr. Nathan Womack, Chapel Hill, N. C., Secy.

American Urological Association, St. Louis, May 11-14, 1953. Dr. George F. Cahill, New York, Pres.; Dr. C. H. DeT. Shivers, 121 S. Illinois Ave., Atlantic City, N. J., Secy.

Association of American Physicians and Surgeons, Denver, Oct. 2-4, 1952. Dr. Denton Kerr, Houston, Pres.; Mr. Harry E. Northam, 360 N. Michigan Ave., Chicago 1, Executive Secy.

International College of Surgeons, U. S. Chapter, Chicago, Sept. 2-5, 1952. Dr. H. W. Meyerding, Rochester, Minn., Pres.; Dr. Arnold S. Jackson, 1516 Lake Shore Drive, Chicago, Secy.

National Tuberculosis Association, Los Angeles, May 18-22, 1953. Dr. Sidney J. Shipman, San Francisco, Pres.; Mr. Kemp D. Battle, 1790 Broadway, New York 19, Secy.

Radiological Society of North America, Cincinnati, Dec. 7-12, 1952. Dr. Joseph C. Bell, Louisville, Ky., Pres.; Dr. D. S. Childs, 713 E. Genesee, Syracuse 2, N. Y., Secy.

Southern Medical Association, Miami, Nov. 10-13, 1952. Dr. R. J. Wilkinson, Huntington, W. Va., Pres.; Mr. C. P. Loranz, 1020 Empire Bldg., Birmingham 3, Ala., Secy.

Southern Psychiatric Association. Dr. R. Burke Suitt, Durham, N. C., Pres.; Dr. Newdigate M. Owensby, Medical Arts Bldg., Atlanta, Ga., Secy.

Southern Surgical Association, Hollywood, Fla., Dec. 9-11, 1952. Dr. I. Mims Gage, New Orleans, Pres.; Dr. John C. Burch, 2112 West End Ave., Nashville 5, Tenn., Secy.

Southwest Allergy Forum, Kansas City, Mo., 1953. Dr. Orval R. Withers, Kansas City, Mo., Pres.; Dr. James Holman, Medical Arts Bldg., Dallas, Secy.

Southwest Regional Cancer Conference, Fort Worth, Sept. 24-25, 1952. Secy., 209 Medical Arts Bldg., Fort Worth.

Southwestern Medical Association, Albuquerque, N. Mex., Oct. 30-Nov. 1, 1952. Dr. James Walsh, Douglas, Ariz., Pres.; Dr. W. W. Schuessler, 1415 First National Bank Bldg., El Paso, Secy.

Southwestern Surgical Congress, Dallas, Oct. 20-22, 1952. Dr. Michael E. DeBakey, Houston, Pres.; Dr. C. R. Rountree, 1227 Classen, Oklahoma City 3, Secy.

Tri-State Medical Assembly, Texarkana, Oct. 2-3, 1952, Dr. Frank G. Thibault, El Dorado, Ark., Pres.; Dr. Albert M. Hand, Le Bonheur Children's Hospital, Memphis 3, Tenn., Secy.

United States-Mexico Border Public Health Association, Ciudad Juarez, Chihuahua, Mexico, 1953. Dr. Salvador Molina Velez, Nuevo Leon, Mexico, Pres.; Dr. Sidney B. Clark, 314 U. S. Court House, El Paso, Secy.

STATE

Private Clinics and Hospitals Association of Texas, Austin, Oct. 24-25, 1952. Dr. Harvey Renger, Hallettsville, Pres.; Dr. Neil D. Buie, Marlin, Secy.

Texas Academy of General Practice, San Antonio, Sept. 15-16, 1952. Dr. Van D. Goodall, Clifton, Pres.; Dr. B. H. Bayer, 104 E. Twentieth St., Houston, Secy.

Texas Academy of Internal Medicine, Dallas, Dec. 6-7, 1952. Dr. W. C. Dine, Amarillo, Pres.; Dr. John S. Chapman, 3810 Swiss Ave., Dallas, Secy. Meetings restricted to members.

Texas Air-Medics Association, Houston, April 27, 1953. Dr. Claire F. Miller, Waco, Pres.; Dr. J. S. Minnett, 2512 Welborn, Dallas, Secy.

Texas Association of Blood Banks, Galveston, Dec. 5-6, 1952. Dr. E. E. Muirhead, Dallas, Pres.; Miss Marjorie Saunders, 3500 Gaston Avenue, Dallas, Secy.

Texas Association of Obstetricians and Gynecologists, Fort Worth, 1953. Dr. D. D. Wall, San Angelo, Pres.; Dr. Carey Hiett, 815 Fifth Ave., Fort Worth, Secy.

Texas Chapter, American College of Chest Physicians. Dr. Robert B. Morrison, Austin, Pres.; Dr. Samuel Topperman, East Texas State Sanatorium, Tyler, Secy.

Texas Club of Internists. Dr. Herbert Hill, San Antonio, Pres.; Dr. Hatch W. Cummings, Jr., 203 Hermann Professional Bldg., Houston, Secy.

Texas Dermatological Society, Waco, Fall, 1952. Dr. C. H. McCuistion, Austin, Pres.; Dr. Thomas L. Shields, 1216 Pennsylvania Ave., Fort Worth, Secy.

Texas Diabetes Association. Dr. E. K. Doak, Houston, Pres.; Dr. Ivan Mayfield, 1318 Main, Lubbock, Secy.

Texas Division, American Cancer Society. Mr. Frank C. Smith, Houston, Pres.; Mr. J. Louis Neff, 1609 Colorado, Austin, Executive Director.

Texas Heart Association, Houston, April 27, 1953. Dr. J. C. Crager, Beaumont, Pres.; Miss Roberta Miller, 411 Reserve Loan Life Bldg., Dallas, Executive Secy.

Texas Hospital Association, Galveston, May 12-14, 1953. Mr. Carroll H. McCray, Tyler, Pres.; Mrs. Ruth Barnhart, 2210 Main St., Dallas, Secy.

Texas Neuropsychiatric Association. Dr. Don Morris, Dallas, Pres.; Dr. John L. Otto, John Sealy Hospital, Galveston, Secy.

Texas Orthopedic Association, Houston, April 27, 1953. Dr. Felix Butte, Dallas, Pres.; Dr. Margaret Watkins, 3629 Fairmount St., Dallas, Secy.

Texas Pediatric Society, Dallas, Oct. 17-18, 1952. Dr. C. S. E. Touzel, Fort Worth, Pres.; Dr. M. C. Carlisle, 1410 Austin Ave., Waco, Secy.

Texas Public Health Association, Galveston, Feb. 15-18, 1953. Mr. H. E. Drumwright, Dallas, Pres.; Mr. Earle W. Sudderth, Dallas County, Health Department, Court House, Dallas, Executive Secy.

Texas Radiological Society, San Antonio, Jan. 23-24, 1953. Dr. Robert D. Moreton, Fort Worth, Pres.; Dr. R. P. O'Bannon, 650 Fifth Ave., Fort Worth, Secy.

Texas Railway and Traumatic Surgical Association. Dr. Everett Lewis, Houston, Pres.; Dr. W. D. Marrs, 306 Broadway, Fort Worth, Secy.

Texas Rheumatism Association, Dallas, December, 1952. Dr. Robert H. Mitchell, Fort Worth, Pres.; Dr. Charles H. Cornwell, Marlin, Secy.

Texas Society for Mental Health, Austin, March 2-3, 1953. Mr. William Grant, Jr., Baytown, Pres.; Mrs. Elizabeth F. Gardner, 2504 Jarratt Ave., Austin 21, Executive Secy.

Texas Society of Anesthesiologists. Dr. John F. Winter, San Antonio, Pres.; Dr. C. R. Allen, John Sealy Hospital, Galveston, Secy.

Texas Society of Gastroenterologists and Proctologists. Dr. Jack Kerr, Dallas, Pres.; Dr. C. P. Hardwicke, 120 W. Seventh St., Austin, Secy.

Texas Society of Ophthalmology and Otolaryngology, Houston, Dec. 5-6, 1952. Dr. J. Charles Dickson, Houston, Pres.; Dr. Lyle Hooker, 627 Esperson Bldg., Houston, Secy.

Texas Society of Pathologists, Houston, Jan. 25, 1953. Dr. Charles T. Ashworth, Fort Worth, Pres.; Dr. Lloyd R. Hershberger, Shannon Memorial Hospital, San Angelo, Secy.

Texas Surgical Society, Austin, Oct. 6-7, 1952. Dr. Robert M. Moore, Galveston, Pres.; Dr. Albert W. Hartman, 414 Navarro St., San Antonio 5, Secy.

Texas Tuberculosis Association, Mineral Wells, April 9-11, 1953. Dr. David McCullough, Kerrville, Pres.; Miss Pansy Nichols, 208 E. Ninth, Austin, Executive Secy.

Texas Urological Society. Dr. R. E. Cone, Galveston, Pres.; Dr. Roy M. Morgan, Jr., Hermann Hospital, Houston, Secy.

DISTRICT

First District Society, El Paso, Feb. 13-14, 1953. Dr. Jim Camp, Pecos, Pres.; Dr. H. D. Garrett, First National Bldg., El Paso, Secy.

Second District Society, Big Spring, April 5, 1953. Dr. John Hogan, Big Spring, Pres.; Dr. Arch Carson, Box 111, Big Spring, Secy.

Third District Society, Lubbock, April 14-15, 1953. Dr. James A. Odom, Memphis, Pres.; Dr. James T. Hall, 1626 Fifteenth Street, Lubbock, Secy.

Fourth District Society, San Angelo, Oct. 8, 1952. Dr. B. A. Hallum, Brady, Pres.; Dr. Lloyd R. Hershberger, San Angelo, Secy.

Fifth and Sixth Districts Society, Corpus Christi, 1953. Dr. Y. C. Smith, Sr., Corpus Christi, Pres.; Dr. Robert J. Sigler, 1126 Third Street, Corpus Christi, Secy.

Seventh District Society, Austin. Dr. George W. Tipton, Austin, Pres.; Dr. D. B. Faubion, 1403-C Guadalupe, Austin, Secy.

Eighth District Medical Society. Dr. Leonard Johnson, El Campo, Pres.; Dr. Robert Casey, Texas City, Secy.

Ninth District Society, Baytown, April 1, 1953. Dr. Otto F. Schoenvogel, Brenham, Pres.; Dr. Lyman C. Blair, 1212 Rothwell, Houston, Secy.

Tenth District Medical Society, Orange, Oct. 11, 1952. Dr. Peyton C. Clements, Lufkin, Pres.; Dr. Edmund D. Jones, 2575 South, Beaumont, Secy.

Eleventh District Society, Jacksonville, Fall, 1952. Dr. Roscoe Moore, Mineola, Pres.; Dr. Marlin T. Braswell, Henderson, Secy.

Twelfth District Society. Dr. J. B. Brown, Temple, Pres.; Dr. Neil D. Buie, Marlin, Secy.

Thirteenth District Society, Wichita Falls. Dr. R. E. Cowan, Graham, Pres.; Dr. Robert D. Moreton, 815 Medical Arts Bldg., Fort Worth Secy.

Fourteenth District Society. Dr. W. P. Phillips, Greenville, Pres.; Dr. I. W. Johnston, 502 W. College St., Terrell, Secy.

Fifteenth District Society, Dr. C. B. Reed, Clarksville, Pres.; Dr. William E. Jones, 619 Main, Texarkana.

CLINICS

Dallas Southern Clinical Society, Dallas, March 16-19, 1953. Miss Betty Elmer, Medical Arts Bldg., Dallas 1, Executive Secy.

Central Texas Spring Clinic, Waco. Dr. Walter B. King, 2320 Columbus Ave., Waco, Secy.

International Medical Assembly of Southwest Texas, San Antonio, Jan. 27-29, 1953. Dr. John M. Smith, Jr., 205 Camden St., San Antonio, Secy.

New Orleans Graduate Medical Assembly, March 2-5, 1953. Dr. Woodard D. Beacham, Room 103, 1430 Tulane Ave., New Orleans 12, Secy.

North Texas-Southern Oklahoma Fall Clinical Conference, Wichita Falls, Sept. 17, 1952. Dr. E. Aubrey Cox, Hamilton Bldg., Wichita Falls, Chairman.

Oklahoma City Clinical Society Conference, Oklahoma City, Oct. 27-30, 1952. Mrs. Muriel R. Waller, 512 Medical Arts Bldg., Oklahoma City 2, Executive Secy.

Postgraduate Medical Assembly of South Texas, Houston, 1953. Dr. C. A. Dwyer, Secy., 229 Medical Arts Bldg., Houston.

POSTGRADUATE MEDICINE IN TEXAS

Several series of postgraduate courses in medicine have been scheduled throughout the state during 1952 and 1953 to bring the Texas physician up-to-date on newer developments in medicine and to afford him an opportunity to take refresher courses in his field.

Postgraduate medical facilities as outlined by the Council on Medical Education and Hospitals include the second yearly program of telephone broadcast courses of the Texas Medical Association, refresher courses offered by the Postgraduate Division of the University of Texas Medical Branch in Galveston, and several series of medical courses to be offered by the Postgraduate School of Medicine of the University of Texas in several Texas cities, as well as special assembly programs.

TELEPHONE BROADCAST SERIES

For the second year, a series of medical programs will be broadcast by telephone imparting postgraduate medical information to physicians of Texas. Four panel discussions on timely subjects have been selected by the Telephone Postgraduate Broadcast Committee for 1953. These dates and subjects are as follows:

February 10: Modern Concepts of Peptic Ulcer—Dr. Tate Miller, Dallas, moderator.

March 10: Evaluation of Present Status of Poliomyelitis—Dr. J. M. Coleman, Austin, moderator.

October 13: Practical Management of More Frequent Obstetrical Emergencies—Dr. W. F. Mengert, Dallas, moderator.

November 10: Use and Abuse of Antibiotics—Dr. James E. Kreisle, Austin, moderator.

Each moderator will be assisted by a panel of four teachers experienced in some phase of the general subject. Visual

aids in the form of slides will be used and a question and answer period will be provided.

The Trustees have agreed that the Texas Medical Association will bear the expense of staging the broadcasts and the "bridging charges" in each city receiving the program. In this way, the only expense upon the county societies participating will be the cost of an amplifier and the cost of running a line from the long distance telephone exchange to the place of meeting.

POSTGRADUATE COURSES IN GALVESTON

Dr. E. Ivan Bruce, director of the Postgraduate Division of the University of Texas Medical Branch, has announced the tentative schedule of postgraduate courses for 1951-1952 in Galveston. The courses are to be given subject to a minimum of thirty registrants, and tuition will vary from $10 to $25 depending on the length of each course.

The tentative schedule is as follows:

Tumors of the Head and Neck—October 9-11.
Pediatrics—November 10-15.
Thoracic Disease—December 1-4.
Neurology—January 9-10.
Dermatology—January 16-17.
Psychiatry for the General Practitioner—February 8-13.
Traumatic Surgery—February 23-27.
Tumors—March 23-25.
Obstetrics—April 13-17.
Anesthesiology—April 24-25.

Inquiries may be addressed to Dr. Bruce and more detailed announcements will be made later.

POSTGRADUATE SCHOOL OF MEDICINE

A series of postgraduate courses will be offered by the Postgraduate School of Medicine of the University of Texas in Houston, Austin, Corpus Christi, San Antonio, San Angelo, and Temple. Tuition for each course will be $25. Further information about the courses may be obtained by writing the Dean, 1400 Outer Belt Drive, Houston 25.

Houston

The schedule of courses for Houston is as follows:

Obstetrics, weekly from September 4 to December 11.
Pediatrics, weekly from September 4 to December 11.
Office Urology, weekly from September 9 to December 16.

Austin

Present Treatment in General Surgery, weekly from September 15 to November 17.
Office Dermatology, weekly from December 1 to February 2.

Corpus Christi

Office Orthopedics, weekly September 10 to November 12.
Present Treatment in General Surgery, weekly from December 10 to February 25.

San Antonio

Practical Gynecology, a week-end course to be offered in October, the date to be announced later.
Abdominal Surgery, a week-end course to be offered in November, the dates to be announced later.
Diagnosis and Treatment of Cardiovascular Disease, a week-end course to be offered in January, the dates to be announced later.

San Angelo

Internal Medicine of General Practice, to be offered during the fall and winter, the exact dates to be announced later.
Recognition and Management of Common Skin Disease, to be offered during the spring of 1953; exact dates will be announced later.
Common Diseases of the Eyes, Ears, Nose, and Throat, to be offered in the spring of 1953, dates to be announced later.

Temple

Two to four week courses will be offered on the subjects of orthopedic surgery, allergy, obstetrics, ophthalmology and otolaryngology, clinical urology, proctology, anesthesiology, pediatrics, electrocardiology, radiology, dermatology and syphilology, clinical pathology, and surgical pathology and pathologic anatomy. Information regarding the dates and tuition for these courses may be secured by writing to the Assistant Dean, Temple Division, University of Texas Postgraduate School of Medicine.

POSTGRADUATE ASSEMBLIES

Postgraduate Medical Assembly of South Texas

The 1953 annual meeting of the Postgraduate Medical Assembly of South Texas will be held in Houston during July.

At the close of the eighteenth assembly last month, Dr. R. M. Johnson of Houston became president of the assembly for 1953. The outgoing president is Dr. Frank H. Lancaster of Houston.

More than 2,400 persons attended the three-day meeting at which twenty out-of-state physicians spoke before the medical, surgical, and eye, ear, nose, and throat scientific sections. At the luncheon on the closing day of the assembly, gold keys were presented to the following past presidents of the assembly: Drs. B. T. Vanzant, Alvis E. Greer, Claude C. Cody, Jr., Herbert T. Hayes, J. E. Clarke, Cornelius Pugsley, Byron P. York, F. J. Slataper, M. B. Stokes, J. G. Flynn, Abbe A. Ledbetter, E. Trowbridge Wolf, and Frank H. Lancaster, all of Houston.

Officers elected were Dr. H. E. Dustin, Houston, president-elect; Dr. Carlos Fuste, Alvin, vice-president; Dr. W. Price Killingsworth, Port Arthur, vice-president; Dr. R. W. Pipkin, Baytown, vice-president; Dr. C. A. Dwyer, Houston, secretary; and Dr. Charles D. Reece, Houston, treasurer. Dr. C. Forrest Jorns, Houston, was named to the executive committee for one year and the following physicians were chosen as directors: Drs. T. G. Blocker, Jr., Galveston, eighth district; Frank Ray Black, Huntsville, C. Forrest Jorns, Houston, F. J. Slataper, Houston, H. L. Stewart, Navasota, and E. Trowbridge Wolf, Houston, ninth district; and David Bennett, Orange, and Eugene W. Lindsey, Beaumont, tenth district.

Dallas Southern Clinical Society

Four postgraduate conferences will be held in 1952 by the Dallas Southern Clinical Society.

Cardiology will be the subject of the first conference September 8-11. Dr. Tinsley R. Harrison, professor of medicine at the Medical College of Alabama, Birmingham, and Dr. Don W. Chapman, associate professor of medicine at Baylor University College of Medicine, Houston, are the featured speakers for this conference.

Dr. Gilbert B. Forbes, professor of pediatrics at the Southwestern Medical School of the University of Texas, Dallas, and Dr. J. Lamar Callaway, professor of dermatology at Duke University School of Medicine, Durham, N. C., will be the chief speakers for the conference on pediatrics and pediatric dermatology September 29-October 1.

At the conference on obstetrics and gynecology November 3-5, Dr. Albert W. Diddle of Knoxville, Tenn., will speak.

The speakers for the postgraduate conference on surgery December 8-10 are to be announced later.

Details may be obtained from the Dallas Southern Clinical Society, 433 Medical Arts Building, Dallas.

Southwest Regional Cancer Conference

The sixth annual Southwest Regional Cancer Conference will be held at the Hilton Hotel in Fort Worth on September 24-25.

Distinguished speakers for the program are as follows: Dr. Hugh Hare, head of the Department of Radiology, Lahey Clinic, Boston; Dr. John Henderson Lamb, associate professor of dermatology and syphilology, University of Oklahoma, Oklahoma City; and Dr. Willis J. Potts, surgeon in chief, Children's Memorial Hospital, Chicago.

A tumor clinic teaching conference will be held the evening of September 24, with all guests participating. The clinical conference as well as a luncheon with a question and answer period will take place September 25. There is no registration fee.

Additional information may be secured from the Southwest Regional Cancer Conference, 209 Medical Arts Building, Fort Worth.

International Medical Assembly of Southwest Texas

The International Medical Assembly of Southwest Texas, which meets in San Antonio in January each year, has scheduled the 1953 meeting for January 27-29.

North Texas-Southern Oklahoma Clinical Conference

The North Texas-Southern Oklahoma Fall Clinical Conference will be held in Wichita Falls on September 17.

CONFERENCE ON INDUSTRIAL HEALTH

The fifth annual Gulf Coast Regional Conference on Industrial Health has been set for September 24-27 in Houston, with Dr. W. H. Hamrick as chairman. The program will include symposiums on health in the transportation industry, alcoholism, industrial waste, and pulmonary diseases. Small industries, industrial nurses, labor-management relations as they affect health, and legal problems in industrial health also will be given attention.

An all-inclusive advance registration fee of $10.50 will cover registration, luncheon, and a copy of conference proceedings. Advanced registrations at this reduced rate will be accepted up to noon September 23.

Further information may be obtained by writing the Industrial Health Conference, P. O. Box 2371, Houston.

Texas Academy of General Practice

The third annual scientific assembly of the Texas Academy of General Practice will be held in San Antonio, September 15 and 16, when six out-of-state speakers will participate in the scientific program.

Dr. R. B. Robins, Camden, Ark., president of the American Academy of General Practice, will address the assembly.

Other speakers and their subjects include:

DR. J. ENGLEBERT DUNPHY, senior surgeon, Peter Bent Brigham Hospital, Boston: "Problems in Gallbladder Disease" and "Differential Diagnosis of the Acute Abdomen."

DR. PHILIP THOREK, clinical associate professor of surgery, University of Illinois College of Medicine, Chicago: "The Pancreas and the Practitioner" and "Practical Aspects of Inguinal Hernia."

DR. C. F. GASTINEAU, Department of Medicine, Mayo Clinic, Rochester, Minn.: "The Management of Diabetes" and "The Low Basal Metabolic Rate."

DR. JAMES A. GREENE, professor of medicine, Baylor University College of Medicine, Houston: "Recognition and Treatment of Chronic Intermittent Partial Small Bowel Obstruction" and "Diagnosis and Treatment of Hypertension."

DR. CONRAD G. COLLINS, professor of gynecology and associate professor of obstetrics, Tulane University School of Medicine, New Orleans; "Management of Carcinoma of Gynecologic Organs" and "Pelvic Infections."

DR. GLADYS J. FASHENA, professor of pediatrics, Southwestern Medical School, Dallas: "The Diagnosis of Congenital Heart Disease" and "The Problem of Vomiting in Infancy."

DR. G. W. N. EGGERS, professor of orthopedics, University of Texas Medical Branch, Galveston: "Fractures of the Ankle Joint" and "Fractures in Children."

DR. ARTHUR G. SCHOCH, Department of Dermatology, Southwestern Medical School, Dallas: "The Proper Management of Syphilis in the Antibiotic Era" and "Newer Developments in the Treatment of Skin Diseases."

DR. J. M. MAAS, Medical Department, Research Laboratories, Eli Lilly and Company, Indianapolis: "A Discussion of the Increasing Promiscuity and Abuse with the Barbiturates" and "Regional Anesthesia in Obstetrics."

The academy is urging that advance registration be made by writing to the Texas Academy of General Practice, 344 New Moore Building, San Antonio. Registration fee is $20.

SOUTHWESTERN MEDICAL SCHOOL

The Board of Regents of the University of Texas has revealed that increases in the salaries of teachers and research members of the Southwestern Medical School will come from a grant recently made to the school by the Southwestern Medical Foundation.

Dr. George N. Aagaard, dean of the school, states that $44,400 of the $59,800 grant will be used for this purpose. He also indicates that $7,500 will be used to construct and furnish a temporary research laboratory to replace the wooden laboratory damaged by fire April 3. In addition, Dr. Aagaard points out that $5,000 of the grant will be used by the faculty in attending scientific conferences.

UNIVERSITY OF TEXAS MEDICAL BRANCH

Curricula in medical services have been organized at the University of Texas Medical Branch under the direction of George Crosby, Ph. D. Coordinated instructional facilities for clinical laboratory technology, radiation technology, physical therapy, occupational therapy, medical record librarianship, medical case work, clinical psychology, medical illustration, and hospital administration will be offered. The Council on Medical Education and Hospitals of the American Medical Association has approved the curricula for clinical laboratory technology, radiation technology, physical therapy, and occupational therapy, the only fields in the medical services for which the council has established curricula standards.

Staff changes at the Medical Branch include the appointment of Dr. E. S. McLarty as director of the General Practice Preceptorial Program; promotion of Dr. Gaynelle Robertson to professor of ophthalmology; appointment of Dr. Raphael Mendez, director of the Pharmacology Laboratories of the Cardiology Institute at Mexico City, as lecturer in pharmacology and toxicology; appointment of Patrick Romanell, Ph. D., formerly professor of philosophy at Wells College, Aurora, N. Y., as associate professor of the philosophy and ethics of medicine and public health; and appointment of E. N. Cappleman, C. P. A., business manager of the University of Texas Medical Branch, as associate professor of medical and public health economics.

Renewal of a $5,000 research grant to the Department of Pediatrics at the University of Texas Medical Branch was announced recently by Sharp and Dohme, Inc., sponsors of the grant. The grant is to be used by Dr. Harriet Felton for clinical and laboratory evaluation of soluble pertussis vaccine. Research studies will be directed by Dr. Arild E. Hansen, chairman of the Department of Pediatrics.

Dr. George R. Herrmann, director of the Cardiovascular Research Laboratory at the Medical Branch, will participate in the postgraduate course of the National Institute of Cardiology on October 2-8 in Mexico and then proceed October 11 to San Antonio where he will take part in the postgraduate course to be given by the University of Texas

Postgraduate School. Dr. Herrmann has had official invitations to address the faculties of medical schools in Brazil, Uruguay, Chile, Peru, Colombia, and Costa Rica on his way to and from Buenos Aires, where he will serve as an official delegate of the American Heart Association to the Fourth Inter-American Cardiological Congress, August 31-September 7.

Dr. Joseph C. Magliolo, Dickinson, has been appointed by the Board of Regents of the University of Texas to serve as general practice residency sponsor for the American Academy of General Practice, filling the vacancy created by the death of the late Dr. Emil H. Klatt, informs the *Alumni Bulletin* of the University of Texas Medical Branch.

Dr. G. W. N. Eggers, professor of orthopedic surgery, and Mrs. Eggers sailed in June for Europe where Dr. Eggers planned to attend the joint meeting of the Orthopedic Association of the British Commonwealth and the United States of America held in London from June 30 to July 4, according to a news item in the *Alumni Bulletin* of the University of Texas Medical Branch.

SOUTHWESTERN SURGICAL CONGRESS

The Southwestern Surgical Congress will meet October 20-22 at the Baker Hotel, Dallas, for a series of lectures, round-table discussions, panel discussions, and motion pictures presented by six guest speakers and a number of members of the congress. The sessions will be open to all interested physicians. A registration fee of $10 to cover the various events will be charged physicians who are not members of the Southwestern or Southeastern Surgical Congress, residents, or interns.

Drs. Joseph G. Hamilton, professor of experimental medicine and radiology at the University of California, Berkeley and San Francisco; Charles L. Martin, professor of radiology at Southwestern Medical School of the University of Texas, Dallas; William Perrin Nicolson, Jr., Atlanta, Ga.; Mark M. Ravitch, assistant professor of surgery at Johns Hopkins University, Baltimore; John D. Stewart, professor of surgery at the University of Buffalo School of Medicine, Buffalo; and Gershom J. Thompson, professor of urology at the Mayo Foundation, Rochester, Minn., will be the featured speakers. They also will participate in round-table discussions.

Drs. J. Albert Key, clinical professor of orthopedic surgery at Washington University School of Medicine, St. Louis; J. P. Pratt, consultant in the Department of Gynecology at Henry Ford Hospital, Detroit; and Earl F. Weir, director of the Department of Anesthesiology at Baylor University Hospital, Dallas, will moderate panel discussions in their fields.

Further information may be obtained from the Southwestern Surgical Congress, 1227 Classen, Oklahoma City 3.

Radiologists of Nation to Visit Texas

The American Roentgen Ray Society, the second oldest radiological society in the world, will hold its first meeting ever to be staged in the Southwest at the Shamrock Hotel in Houston, September 23-26. Dr. Charles L. Martin, Dallas, will be installed as president during the Texas session.

Scientific sessions and exhibits will be open to all interested physicians, and there will be no registration fee for visitors. Refresher courses for physicians specializing in radiology, to be held each morning, will be open to nonmembers at a small fee payable in advance. Entertainment will include an annual banquet, a golf tournament, and special parties for wives of members and their guests. Fishing parties and all-expense tours through Mexico will be made available to those interested.

Drs. Clyde A. Stevenson and McClure Wilson, Temple, will participate in the program, which will include more than thirty papers on numerous types of conditions in which radiology is important in diagnosis or treatment and will be presented by outstanding specialists from throughout the United States. A symposium on breast cancer, the Caldwell Lecture on "Growth Differentiation and Disease" by Dr. Edward B. D. Neuhauser of Boston, and a film reading session will be offered.

Additional information about the Houston meeting of this national organization, which is expected to attract about 1,200 members and visitors, may be obtained from Dr. Palmer E. Wigby, Houston, who with Mrs. Wigby heads a large local arrangements committee, or Dr. Martin, currently serving as president-elect of the society.

Cancer Research Grant Made to M. D. Anderson Hospital

Twenty-one grants to aid cancer control projects in hospitals, medical schools, universities, and other institutions in twelve states and the District of Columbia were announced recently by the United States Public Health Service.

Among them is an $18,200 grant to be used by Dr. William O. Russell at the University of Texas M. D. Anderson Hospital for Cancer Research, Houston, to establish a tumor registry and library of tumor slides.

Made on recommendation of the National Advisory Cancer Council, the grant will be administered by the National Cancer Institute of the National Institutes of Health.

ARMY SETS COURSES FOR PHYSICIANS

Seventeen short postgraduate courses, open to both military and civilian physicians, will be sponsored by the Army Medical Service the last six months of 1952, announces Major General George E. Armstrong, Surgeon General of the Army.

The only course in Texas will be in tumor surgery October 13-17 at Brooke Army Hospital. Fort Sam Houston. Others in arthritis, internal medicine, electrocardiography and heart disease, radiation injuries, forensic pathology, clinical pathology, exfoliative cytology and cancer detection, physical medicine, psychotherapeutic medicine, pulmonary diseases, radiology, and surgery will be held during the months from September through December at federal installations in Hot Springs, Ark.; San Francisco; Washington, D. C.; and Denver.

Further information may be obtained from the Office of Public Information, Department of Defense, Washington 25, D. C.

AMERICAN MEDICAL SOCIETY OF VIENNA

The American Medical Society of Vienna has been established to encourage postgraduate study in Vienna by American doctors. This organization, replacing the American Medical Association of Vienna which became defunct in 1938, will provide meeting and library facilities, arrange for living accommodations, and facilitate in every way possible the travel and comfort of visiting doctors. The American Embassy in Vienna has encouraged the reorganization of the society and has assured its full cooperation. A complete course registry listing more than 515 English language courses is available. Registration for courses can be made at any time throughout the year.

All correspondence relating to postgraduate courses may be addressed to Dr. M. Arthur Kline, executive secretary of the society, c/o Vienna Academy of Medicine, Allgemeines Krankenhaus, Direktionsgebaude, Vienna IX, Alserstrasse 4, Austria.

PERSONALS

Dr. Alvis E. Greer, Houston, was named president-elect of the American College of Chest Physicians when it met in Chicago, June 5-8. Also serving in the official family of the organization are *Dr. Elliott Mendenhall,* Dallas, member of the board of regents, and *Dr. Robert B. Morrison,* Austin, member of the board of governors.

Dr. G. V. Brindley, Jr., Temple, has been named secretary of the Southern Society of Clinical Surgeons, reports the Waco *Times Herald.*

Dr. J. Shirley Sweeney, Gainesville, recently gave two lectures at a postgraduate assembly at the University of Oklahoma, Oklahoma City. Also, in May he presented the annual lecture in memory of Dr. Frank Vinsonhaler at the University of Arkansas Medical School, Little Rock.

Dr. Edwin L. Rippy is vice-president of the board of directors of the Dallas Child Guidance Clinic, informs the Dallas *News.*

Dr. and Mrs. Paul H. Frenzel, McAllen, are in Europe, where Dr. Frenzel attended a medical convention in London during July, the Brownsville *Herald* states.

Dr. Donald H. Slaughter, formerly dean of students at Southwestern Medical College, Dallas, died June 6 at his home in Vermillion, S. D., of organic heart disease, reports the Dallas *Times Herald.*

Dr. S. W. Lester, Port Lavaca, received the first annual citation for public service as the "Outstanding Citizen of Calhoun County in 1952" at the annual Chamber of Commerce banquet June 27, reports the Victoria *Advocate.*

Mrs. William B. Sharp, wife of Dr. Sharp, professor of bacteriology and parasitology at the University of Texas Medical Branch, Galveston, died in San Antonio June 20, the San Antonio *Evening News* states.

Dr. Louis P. Kirkpatrick, formerly of Reagan and Houston and now a captain with the First Marine Division, has been named one of the vice-presidents of the "38th Parallel Medical Society of Korea." The society meets twice a month to hear experts on medical subjects from Japan, the Department of the Army, or elsewhere, and is composed of medical personnel on duty near the thirty-eighth parallel in Korea.

Dr. and Mrs. I. D. Ellis, Troy, in May observed their golden wedding anniversary, records the Waco *Tribune Herald.* A family reunion celebrated the event.

Dr. Andrew S. Tomb, Victoria, has been named a consultant in general practice on the editorial board of *Current Medical Digest,* the monthly digest of medical literature published by the Williams and Wilkins Company.

Dr. Virgil M. Payne, Jr., Dallas, has been elected as presiding officer (Big Chief) of the Dallas Bonehead Club an unusual luncheon club whose purpose and aim is to supply its members with dignified, refreshing foolishness, according to articles in recent issues of the *Dallas Medical Journal* and the *Texas Parade.*

Dr. Wallace C. Kimbrough, veteran Denton County physician, recently was honored by having his portrait, the first to be hung, placed in a new gallery of pioneer doctors at Flow Memorial Hospital, Denton, reports the Denton *Record-Chronicle.*

Dr. Joseph V. Hopkins, Victoria, has been chosen as that area's "Favorite Good Neighbor" in a contest sponsored by the Victoria *Advocate,* states the *Advocate.*

TEXANS ELECTED TO COLLEGE OF PHYSICIANS

Six Texas physicians became fellows and eight associates in the American College of Physicians at its annual session in Cleveland in April. Those elected as fellows are Drs. Alfred H. Hill, San Antonio; W. Price Killingsworth, Port Arthur; C. Ralph Letteer, San Antonio; Samuel Irving Miller, Houston; Ephraim L. Wagner, Houston; and A. Ford Wolf, Temple. Associates named include Drs. Hugh F. Arnold, Houston; John James Christian, Temple; Daniel Jackson, Houston; John Stanley Marietta, Fort Worth; Donald Wallace Munsell, Dallas; DeWitt Neighbors, Fort Worth; Edwin Marvin Ory, Houston; and Jackson Algernon Smith, Houston.

ALCOHOLISM INSTITUTE IN DENVER

A Rocky Mountain Regional Institute on Alcoholism will be held in Denver, September 30 and October 1 and 2 under the joint sponsorship of the Colorado State Department of Public Health, the Colorado Commission on Alcoholism, and the University of Colorado School of Medicine. Six nationally recognized authorities will participate in the program, which is planned to give special consideration to the role of the general practitioner in the management of the "problem drinker" during the first two days and to problems related to education, industry, the courts, and law enforcement on the third day. A public meeting is scheduled for one evening.

Requests for further information may be addressed to the Office of Graduate and Postgraduate Education, University of Colorado Medical Center, 4200 East Ninth Avenue, Denver 20.

ISONIAZID FOR TUBERCULOSIS THERAPY RELEASED

The new antituberculosis drug, isonicotinic acid hydrazide (isoniazid) has been released by the Food and Drug Administration for distribution by drug manufacturers for use under "close medical supervision." All licensed physicians may prescribe the drug for their patients, but medical officers of the FDA warned that the drug should be used in selected cases for the treatment of streptomycin-resistant tuberculosis and only under the close supervision of a physician. Although permission from the FDA for distribution of the drug was based on clinical and pharmacological studies reported by the drug manufacturers, the FDA announcement implies no approval or endorsement. The Council on Pharmacy and Chemistry of the American Medical Association has taken action similar to that of the Food and Drug Administration in that it recommends caution in use of the new drug.

Nonprofit Medical Foundation for Wharton

The Gulf Coast Medical Foundation, established to acquire, erect, maintain, and operate a "benevolent, charitable, scientific, and educational foundation for the treating of the sick and for the purpose of training and educating young women in the nursing profession, for developing and training young physicians and surgeons, and for conducting postgraduate work, study, and research in the various fields of medicine," has been created in Wharton. Approximately $200,000 has been pledged for construction of a medical center, the Wharton *Journal* reports.

TEMPORARY SUSPENSION OF SERVICE

The package service of the Texas Medical Association Library will be suspended from August 15 to September 1 to permit an orderly removal of reprints, periodicals, and books to the new headquarters building. The necessity for packing, storing, and rearranging Library materials will make it impossible to continue regular service during the two-week period. The motion picture film service will be maintained on a limited basis.

LIBRARY SECTION

PACKAGE SERVICE

The package library consists of collections of reprints and other periodical material on various subjects, prepared for lending to members of the Association. Request for packages should be addressed "Library, Texas Medical Association, 1801 Lamar Boulevard, Austin, Texas." Twenty-five cents in stamps should be enclosed with the request to cover postage and part of the expense of collecting the material. Packages are allowed to remain in the hands of the borrower for 14 days.

ACCESSIONS

The following additions were made to the Library during July:

Reprints received, 978.
Journals received, 306.
Books received, 16.

Skin Therapeutics, Prescription and Preparation, Polano; *Manual of Electocardiography,* Smith, Elsevier Press, Amsterdam, Houston, and New York.

Cancer Practice, Basic Principles, Nettleship; *Human Locomotion and Body Form, Study of Gravity and Man,* Morton and Fuller, Williams and Wilkins, Baltimore.

The Human Pelvis, Francis; *Physical Diagnosis,* Walker; *The Oculorotary Muscles,* Scobee; *Studies in Visual Optics,* Pascal; *Synopsis of Genitourinary Diseases,* 5th edition, Dodson and Gilbert, C. V. Mosby Company, St. Louis.

Roentgenology in Obstetrics and Gynecology, 2nd edition, Snow; *Diseases of the Nervous System,* 3rd edition, Ford, Charles C. Thomas, Publishers, Springfield, Ill.

Correlative Cardiology, An Integration of Cardiac Function and the Management of Disease, Shaffer and Chapman; *Principles and Methods of Physical Diagnosis,* Leopold; *Treatment, Injuries to the Nervous System,* Munro; *Culdoscopy, New Technic in Gynecologic and Obstetric Diagnosis,* Decker, W. B. Saunders Company, Philadelphia.

Surgery of the Chest, Johnson and Kirby, Year Book Publishers, Chicago.

Technic of Medication, Smith, J. B. Lippincott Company, Philadelphia.

Forensic Medicine, 2nd edition, Simpson, Edward Arnold and Company, London.

Bulletin, The American College of Radiology, 1952, Chicago.

SUMMARY OF SERVICE

Local users, 61.	Borrowers by mail, 45.
Local packages, 30.	Packages mailed, 51.

Films loaned, 30.

MOTION PICTURE FILM LIBRARY

Motion picture films on medical subjects, 16 mm., both silent and sound, some in color, and suitable for either medical or lay audiences, are available for loan to county medical societies, hospital staffs, or individual physicians, on request. Borrowers will be required to pay only the cost of shipment of the films, by express, with insurance, and for any damage to films in the hands of the borrower.

Request for films should be addressed to "Motion Picture Film Library, Texas Medical Association, 1801 Lamar Boulevard, Austin, Texas." A list of available films, with descriptions, will be furnished on request.

The following motion pictures were loaned by the Library during the month of July:

Anesthesia, Low Spinal (Modified Saddle Block) *in Obstetrics* (Ciba Pharmaceutical Products)—Dr. Richard S. Penly, Falfurrias.

Anesthesia, Novocain, in Obstetrics (Winthrop-Stearns)—Jefferson County Medical Society, Beaumont.

Anesthesia with Vinethene (Merck and Company)—Dr. Peter S. Erhard, Beaumont.

Anoxia, Physiology of (Linde Air Products)—Dr. Peter S. Erhard, Beaumont.

Appendicitis in Childhood (Mead Johnson)—Dr. V. M. Payne, Dallas.

As Others See Us (American Hospital Association)—The Johns Clinic and Hospital, Taylor, and Stephenville Hospital and Clinic, Stephenville.

Blood Transfusion, Technique of (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Breast Plastics One-Stage Operation for Pendulous Breasts (Dr. Philip Thorek)—Newburn Sanitarium, Jacksonville.

Cesarean Section, Low Cervical (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Delivery of Triplets (Ciba Pharmaceutical Products)—Dr. C. G. Goddard, Bastrop.

Esophagus, Surgical Treatment for Carcinoma of the Lower End of (Dr. Philip Thorek)—Dr. V. M. Payne, Dallas.

Feeding the Infant During the First Year (Mead Johnson)—Stephenville Hospital and Clinic, Stephenville.

Goiter Surgery (Mead Johnson)—Dr. V. M. Payne, Dallas.

Hysterectomy (Mead Johnson)—Dr. V. M. Payne, Dallas.

Modern Nutrition (E. R. Squibb and Company)—The Johns Clinic and Hospital, Taylor.

Premature Infant, Care of (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Pyloric Stenosis, Congenital, Surgical Treatment for (Dr. Philip Thorek)—Dr. C. G. Goddard, Bastrop, and Newburn Sanitarium, Jacksonville.

Resuscitation of the Newborn (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Roentgen Pelvimetry (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Skin Studies (Procter and Gamble Company)—Dr. Richard S. Penly, Falfurrias.

Splenic Flexure Carcinoma, Surgical Treatment for, with Solitary Liver Metastasis (Dr. Philip Thorek)—Newburn Sanitarium, Jacksonville.

Spontaneous Delivery (Mead Johnson)—Newburn Sanitarium, Jacksonville.

Sutures Since Lister (Johnson and Johnson)—Stephenville Hospital and Clinic, Stephenville.

Techniques of Injection (Becton, Dickinson and Company)—Stephenville Hospital and Clinic, Stephenville.

Traitor Within (American Cancer Society)—The University of Texas Department of Physical Education, Austin.

Uterosalpingography (E. Fougera and Company)—Dr. V. M. Payne, Dallas.

Vagotomy for Ulcerative Colitis (Dr. Philip Thorek)—Newburn Sanitarium, Jacksonville.

When Bobby Goes to School (Mead Johnson)—Top-of-Texas Retail Druggist Association, Pampa.

BOOK NOTICES

[1]Cardiology for Nurses—1952

WALTER MODELL, M. D., F.A.C.P., *Assistant Professor, Cornell University Medical College; Associate Cardiologist, Beth Israel Hospital and Hospital for Joint Diseases. Fabrikoid, 246 pages. $3.50. New York, Springer Publishing Company, Inc., 1952.*

As indicated by the title, this is a reference book and not a text. It is especially designed for the practicing nurse who wishes to improve her knowledge of cardiac conditions. The student nurse could use it to advantage in conjunction with a more complete book on nursing care. The introduction explains clearly why there are different and sometimes opposite medical approaches to the same conditions. The content covers all forms of cardiac conditions. An informative section on drugs and the low salt diet has been included. The medical treatments are presented with a few pointers specifically for nurses. The book follows a convenient arrangement. More emphasis might have been placed on the responsibilities of the nurse in rehabilitation and the mental health aspects of treatment.

The Quiet Art—1952

DR. ROBERT COOPE, *Fabrikoid, 283 pages. $3. Baltimore, Williams and Wilkins Company, 1952.*

[2]Malignant Diseases of the Female Genital Tract—1951

STANLEY WAY, M.R.C.O.G., *Gynoecologist to the Newcastle Regional Cancer Organization. Fabrikoid, 279 pages. $5. Philadelphia, The Blakiston Company, 1951.*

The author states that this volume was prepared to fill the need for a concise account of malignant neoplasms which are encountered in gynecologic practice today. After reading the book, one is left with the comfortable impression that he has admirably accomplished his purpose.

The material is divided into chapters according to major anatomic divisions of the female genitalia, and there are chapters on miscellaneous neoplasms and malignancies associated with pregnancy. The author uses his background of large and varied experience thoughtfully and advantageously. His conclusions are clear, valid, and in general agreement with the consensus of authorities in this country. His critical and statistical analysis is thoughtful and unbiased. The importance of a clear understanding and constant application of principles in the management of malignant disease is rightfully stressed throughout the book. The first chapter on carcinoma of the vulva alone is worth the price of the book.

The book is of convenient size, printed on a fair grade of paper. The syntax, style, and grammatical usage are excellent. Very few sentences in this book are unimportant. Typographical errors are minimal.

The book is highly recommended to all those who wish to have at hand a concise, accurate account of malignant disease of the female genital tract. It should be especially valuable to the practicing gynecologist. It is probably too condensed for use by the medical student.

[3]Refraction and Motility—1952

WALTER B. LANCASTER, A. B., M. D., D. Sc. Hon. *Fabrikoid, 219 pages. $6. Springfield, Ill., Charles C. Thomas, 1952.*

Dr. Lancaster justifies this new text, first, by trying to present the fundamental principles of optics and physiologic optics in a practical way and without mathematical formulas.

Secondly, he stresses the refinements of subjective refraction. We were taught in our ophthalmologic training that an ophthalmologist was of a necessity a good refractionist. As a sensitive test for astigmatism, Dr. Lancaster prefers the astigmatic dial (with lines 10 degrees apart).

Thirdly, the measurement and treatment of phorias has been neglected in other texts. Dr. Lancaster gives practical advice of handling these cases, admitting that there are differences of opinion, especially regarding the use of orthoptics and surgery.

The Origin of Life and the Evolution of Living Things—1952

OLAN R. HYNDMAN, B. S., M. D., F.A.C.S. *Fabrikoid, 648 pages. $8.75. New York, Philosophical Library, 1952.*

[4]Outline of Fundamental Pharmacology—1951

DAVID FIELDING MARSH, *Professor and Head of the Department of Pharmacology, West Virginia University School of Medicine, Morgantown, W. Va. Fabrikoid, 219 pages. $6. Springfield, Ill., Charles C. Thomas, 1951.*

The objective of this book is completely different from that of the usual textbooks of pharmacology. Instead of describing the properties and effects of a series of drugs, the author attempts to define just what the science of pharmacology is and what general principles may be derived from the study of the interaction of chemicals and living things.

The main topics discussed are dose-effect relationship, localization of site of action, absorption and distribution, fate of drugs, mechanism of action and chemical constitution and biologic action.

Although the author does not attempt to contribute new facts or principles, the book synthesizes much interesting and useful information on the mode of action of drugs which is not available in any one textbook. This outline should be useful to students and teachers of pharmacology and to clinical investigators who do research on therapeutic agents.

Antibiotics—1951

PROFESSOR SIR HOWARD FLOREY, F.R.S., M. A., Ph. D., *Sir William Dunn School of Pathology, Oxford, Fabrikoid, 35 pages. $1.50. Springfield, Ill., Charles C. Thomas, 1951.*

[5]Signs and Symptoms

Edited by CYRIL MITCHELL MACBRYDE, A. B., M. D., F.A.C.P., *Associate Professor of Clinical Medicine, Washington University School of Medicine; Assistant Physician, the Barnes Hospital; Director, Metabolism and Endocrine Clinics, Washington University Clinics, St. Louis. Second edition. Cloth, 737 pages. $10. Philadelphia, J. B. Lippincott Company, 1952.*

An unusually interesting and helpful book, this volume is easy to read. To a practicing physician, it is like presenting many of his problem cases and helping him to evaluate them. The chapter on history takes up many phases and helps refresh our minds on the procedure for taking case histories which is one of the most important arts of diagnosis. Pain, its many causes, influences, and other aspects of pain are discussed. The section on headaches will be helpful to anyone. The various other parts of the body and the various symptoms that they have, including jaundice, fainting, and pathologic bleeding are taken up in a concise, systematic, but interesting manner. I think this book is indeed an addition to any doctor's diagnostic acumen.

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[1]*Chloe S. Floyd, R. N., Galveston.*
[2]*W. F. McLean, M. D., Austin.*
[3]*Hal W. Maxwell, M. D., Dallas.*
[4]*Andres Goth, M. D., Dallas.*
[5]*C. G. Goddard, M. D., Bastrop.*

ORGANIZATION SECTION

AMERICAN MEDICAL ASSOCIATION

PUBLIC RELATIONS WORKSHOP SET

State and county public relations personnel will meet in Chicago September 4 and 5 for the first Public Relations Institute sponsored by the American Medical Association as a supplement to the annual Medical Public Relations Conference.

COUNTY SOCIETIES

Brown-Comanche-Mills-San Saba Counties Society

June 16, 1952

Challenge of Free Enterprise—T. C. Terrell, Fort Worth.

An address on free enterprise in which members of the medical profession were challenged to assert their leadership and assume their responsibility as citizens was the high point of the annual barbecue of the Brown-Comanche-Mills-San Saba Counties Medical Society, held June 16 at Lake Brownwood. Approximately 100 physicians, their families, their office staffs, and hospital personnel were present to hear T. C. Terrell, Fort Worth, President of the Texas Medical Association, speak. William M. Gambrell, Austin, member of the Board of Trustees of the Association, also was present and talked to the group.

M. A. Childress, Goldthwaite, president of the four-county organization, presided.

Colorado-Fayette Counties Society

June 24, 1952

Convulsive Seizures in Children—John Otto, Galveston.

Dr. and Mrs. James H. Wooten were hosts to the members of the Colorado-Fayette Counties Society and Auxiliary on June 24 in Columbus at the last meeting of the year. A chicken barbecue supper was served to thirty-four guests.

Dr. Otto spoke on the above named subject and showed a motion picture film to illustrate his talk. Accompanying him on the trip were Mrs. Otto and Dr. and Mrs. Charles Schulman.

Hardeman-Cottle-Foard-Motley Counties Society

June 19, 1952

(Reported by John M. Taylor, Secretary)

Eye Diseases and Treatment—J. H. Abernathy, Altus, Okla.
Heat Exhaustion—D. E. Fletcher, Wichita Falls.

The Hardeman-Cottle-Foard-Motley Counties Medical Society met in Chillicothe June 19 when the above outlined program was presented.

The society members were joined by the auxiliary and guests for a buffet supper after which a business meeting was held. Correspondence from the society's former secretary, B. W. Gilliotte, now of Zanesville, Ohio, was read. John Taylor, Quanah, was elected to replace Dr. Gilliotte as secretary.

Kaufman County Society

June 18, 1952

Thirty-five members and guests of the Kaufman County Medical Society and Auxiliary were entertained with an informal dinner at the home of Dr. and Mrs. R. W. Holton, Sr., Terrell. After the meal the women played bridge and visited while the physicians had a business meeting and heard a talk by Judge Charles O. Calvin of Dallas.

Lamb-Bailey-Hockley-Cochran Counties Society

May 30, 1952

ACTH (motion picture, courtesy of Armour and Company)—William Nowlin, Littlefield.

A meeting of the Lamb-Bailey-Hockley-Cochran Counties Medical Society in Littlefield on May 30 featured a motion picture on ACTH presented by William Nowlin, secretary of the society and program chairman for the evening. F. B. Faust, Littlefield, president, presided over a business session during which Freeman C. Hays, Littlefield, was elected to membership.

Medina-Uvalde-Maverick-Val Verde-Edwards-Real-Kinney-Terrell-Zavala Counties Society

June 13, 1952

Treatment of Arthritis—James R. Hyslop, Del Rio.
Massive Upper Gastrointestinal Hemorrhage—Edwin M. Sykes, San Antonio.

One member and one guest presented scientific papers when Medina-Uvalde-Maverick-Val Verde-Edwards-Real-Kinney-Terrell-Zavala Counties Medical Society met in Del Rio on June 13. The papers are named above. A business session and dinner also were a part of the evening's activities.

Nueces County Society

The Nueces County Medical Society is expanding its medical library following the acquisition of additional space for its headquarters in Memorial Hospital in Corpus Christi. The library, approved by the American Medical Library Association, is supervised by a committee appointed each year by the president of the society. On the committee this year are C. D. Stewart, chairman; Richard B. Dunham, Jack F. McKemie, J. E. Upshaw, Saul Grossman, W. E. Riley, and Joseph Abbey.

Tarrant County Society

June 3, 1952

The Spring Frolic of the Tarrant County Medical Society was held June 3 at the home of Mr. and Mrs. Leon Bandy. Hosts were Mr. and Mrs. Emmett Weaver and their daughters, Mrs. John Lewis, Mrs. Byron Butt, and Mrs. Robert Bowen.

The party was dedicated to the new members of the society, who were introduced individually by Hobart Deaton, master of ceremonies. More than 400 persons, including members, wives, and guests, were present.

Tom Green-Eight County Society

June 9, 1952

Draft Covenant on Human Rights—Senator Dorsey B. Hardeman, San Angelo.

State Senator Dorsey B. Hardeman, San Angelo, was guest speaker when Tom Green-Eight County Medical Society met June 9 in San Angelo. His subject was the covenant on human rights which is under consideration by the United Nations.

DISTRICT SOCIETIES

Twelfth District Society

July 8, 1952.

The Twelfth District Medical Society met July 8 in Marlin at the Country Club. Speakers for the session included H. H. Brindley, Temple; Jimmy Scruggs, Waco; A. W. Miles, Temple; and J. W. David, Corsicana, district councilor. A seminar on hypertensive cardiovascular disease was conducted by a Brooke Army General Hospital group from San Antonio. Travis Wallace, president of the Great American Reserve Insurance Company, was luncheon speaker.

Some forty physicians were present for the one-day session.

Fourteenth District Society

June 10, 1952

(Reported by L. W. Johnston, Secretary)

Present Concepts Concerning Poliomyelitis—Marion T. Jenkins, Dallas.

Headache—Donald O. Corgill, McKinney.

Clinical and Pathologic Consideration in Cases of Calcific Aortic Stenosis—John R. Kelsey, Paris.

Present Status of Pain-Relieving Drugs—F. A. Duncan Alexander, Louis W. Lewis, and James C. Appleton, McKinney.

Benign Tumors of Breast—Alice Smith, Dallas.

Pelvic and Pelvic-Like Pain—William F. Guerriero, Dallas.

Treatment of Fracture of the Femoral Neck—Malcolm L. Johnson, Paris

Common Bile Duct Obstruction—W. P. Phillips, Greenville.

The Fourteenth District Medical Society and Auxiliary held a one-day meeting June 10 in Greenville. The physicians presented the scientific program outlined and held a business session during which W. P. Phillips, Greenville, was elected president; J. W. Atchison, Gainesville, vice-president; and L. W. Johnston, Terrell, secretary-treasurer. Mayo Tenery, Waxahachie, district councilor, spoke. Doctors joined members of the Auxiliary for a coffee break during the morning, a luncheon with an address on "A Concept of Totality" by Joe D. Nichols, Atlanta, at noon, and entertainment during the evening.

Date and place of the next meeting will be decided later.

AUXILIARY SECTION

AUXILIARY NEWS

Angelina County Auxiliary

The Woman's Auxiliary to the Angelina County Medical Society entertained with the annual Doctor's Day Dinner on May 27 in Lufkin at the home of Dr. and Mrs. L. T. Tinkle. Hostesses for the affair were Mmes. Tinkle, P. C. Clements, A. E. Percy, and Bernard Hyman. About twenty-five guests attended the buffet-style chicken-spaghetti dinner.

Brazoria County Auxiliary

The executive board of the Brazoria County Auxiliary met in Angleton in late June at the home of Mrs. J. C. Montgomery, Jr., president.

Plans for the coming year were discussed and it was voted that the group will sponsor a Negro student nurse at Prairie View College with money from the student loan fund. It was also decided that a card party this fall and a dance this spring would be held as means for raising money for this project and for continuing aid to a John Sealy student nurse.

Denton County Auxiliary

Mrs. Paul E. Weathers, Pilot Point, was elected secretary of the Woman's Auxiliary to the Denton County Medical Society at a meeting in Denton in March.

A book review was presented by Imogene Bentley, Ph. D., dean of women at North Texas State College.

Doctors of Denton County were honored by the Woman's Auxiliary May 30 in Denton with a supper party. Mrs. Walter Miller, retiring president, presented the president's pin to Mrs. Bert Davis, newly-elected president. Thirty-three persons attended the party.

At a meeting of the executive committee of the Denton County Auxiliary held in June in the home of Mrs. Harry Farberes, the group voted to give a tuition scholarship at Texas State College for Women in practical nursing. A Denton County girl will be chosen for the scholarship and she will begin the course in September.

Ector-Midland-Martin-Howard-Andrews-Glasscock Counties Auxiliary

Election of officers was held when the Ector-Midland-Martin-Howard-Andrews-Glasscock Counties Auxiliary met April 15 in Midland. The auxiliary and the society met for dinner before the program and meeting.

Named to office were Mrs. R. B. G. Cowper, Big Spring, president; Mrs. Floyd Mays, Big Spring, secretary-treasurer; Mrs. H. P. McCrimmon, Odessa, first vice-president; Mrs. C. S. Britt, Midland, second vice-president; Mrs. W. S. Parks, Jr., Midland, third vice-president; Mrs. W. K. Green, Odessa, fourth vice-president; Mrs. Leslie C. Colwell, Big Spring, public relations; and Mrs. Roy C. Sloan, Big Spring, legislative chairman. Mrs. Cowper was elected delegate to the State Auxiliary meeting in Dallas.

Galveston County Auxiliary

A "live rebroadcast" of the auxiliary-sponsored radio program, "Healthy Living in Our County," was presented at the meeting of the Galveston County Auxiliary on April 15. Students of Ursuline Academy participated in the program.

Mrs. Edward R. Thompson was in charge of arrangements for the program and Mrs. John McGivney, Galveston, and Mrs. John M. Thiel, Lamarque, were co-chairmen of the coffee at which presidents of women's civic organizations in Galveston were honored.

Hostesses included Mesdames William T. Anderson, George W. Beeler, John J. Delany, E. S. McLarty, Ira Jackson, Norman D. Jarrell, A. J. Jinkins, J. L. Jinkins, Jr., W. C. Levin, George S. McReynolds, and B. R. Parrish.—Mrs. M. A. Caravageli, Recording Secretary.

Officers of the Woman's Auxiliary to the Texas Medical Association: President, Mrs. Robert F. Thompson, El Paso; President-Elect, Mrs. E. W. Coyle, San Antonio; First Vice-President (Organization), Mrs. R. T. Travis, Jacksonville; Second Vice-President (Physical Examinations), Mrs. Troy A. Shafer, Harlingen; Third Vice-President (Today's Health), Mrs. P. R. Jeter, Childress; Fourth Vice-President (Program), Mrs. John D. Gleckler, Denison; Recording Secretary, Mrs. Carlos R. Hamilton, Houston; Treasurer, Mrs. Oscar Marchman, Jr., Dallas; Corresponding Secretary, Mrs. Newton F. Walker, El Paso; Publicity Secretary, Mrs. A. H. Neighbors, Sr., Austin; Parliamentarian, Mrs. Joe D. Nichols, Atlanta.

Grayson County Auxiliary

The Grayson County Auxiliary was entertained at a tea given in the home of Mrs. Paul Pierce, Denison, on May 9 in conclusion of the year's work.

Mrs. John W. Ellis, Sherman, was named secretary at the business meeting presided over by Mrs. S. O. Levin, Denison, president. Mrs. Emmett M. Essin, Jr., Sherman, incoming president, served at the tea table. A report on the annual meeting of the Woman's Auxiliary to the Texas Medical Association was given.—Mrs. F. M. Sporer.

Harris County Auxiliary

The Woman's Auxiliary to the Harris County Medical Society met May 26 for luncheon and a business meeting at which the annual reports were presented. Mrs. J. Peyton Barnes reported on the annual session in Dallas.

Mrs. Otis P. Flynt installed the new officers and Mrs. John K. Glenn gave the invocation. Mrs. Harvey Kincaid sang several selections accompanied by Mrs. B. Q. Green. Mrs. James D. Mabry was chairman of the day with Mrs. Lyman C. Blair and Mrs. Robert K. Blair as co-chairmen.—Mrs. Norborne B. Powell, Publicity Secretary.

Hunt-Rockwall-Rains Counties Auxiliary

The Woman's Auxiliary to the Hunt - Rockwall - Rains Counties Medical Society met May 13 in the home of Mrs. Grady Bruce Greenville, with Mesdames H. L. LyBrand, W. C. Morrow, F. U. Meadows, and E. T. Fry as co-hostesses. Refreshments were served during the social hour.

Mrs. Bruce, the president, conducted the meeting. Mrs. E. T. Crim gave a devotional on the parable of the Good Samaritan. Reports on the State meeting in Dallas were made by Mrs. Bruce, Mrs. J. W. Ward, Mrs. S. D. Whitten, and Mrs. E. T. Crim.

Mrs. C. T. Kennedy, Sr., installed the following officers for the coming year: Mrs. William A. Mitchell, president; Mrs. C. D. Savage, first vice-president; Mrs. Grady Bruce, second vice-president; Mrs. Joe Becton, third vice-president; Mrs. E. T. Crim, recording secretary; Mrs. W. P. Phillips, treasurer; Mrs. H. E. Mehmert, parliamentarian; Mrs. T. C. Strickland, parliamentarian; Mrs. Will Cantrell, historian; and Mrs. S. D. Whitten, publicity secretary.

Jasper-Newton Counties Auxiliary

Members of Jasper-Newton Counties Auxiliary meeting May 21 in the home of Mrs. Rider Stockdale, Jasper, discussed plans for the coming year and installed new officers. Taking office were Mrs. Tom Jones, Pineland, president; Mrs. John T. Moore, Kirbyville, vice-president; Mrs. J. J. McGrath, Jasper, secretary-treasurer; and Mrs. A. J. Richardson, Jasper, parliamentarian. Mrs. J. W. McCall, Jr., was the installing officer.

This year the auxiliary won two state awards, a blue ribbon for its yearbook and a blue ribbon for nurse recruitment.

Jefferson County Auxiliary

The Port Arthur Chapter of Jefferson County Auxiliary was hostess for a Doctor's Day dinner April 23. Cocktails were served before dinner. In charge were Mesdames F. J. Beyt, Frank Keith, J. C. Hines, Nederland, C. E. Painton, J. Y. Harper, L. C. Heare, Dwight Curry, and L. R. Byrd, Jr.

Officers of the auxiliary were inducted at a luncheon May 20 in Port Arthur. Mrs. H. B. Williford, Beaumont, retiring president, presided. She gave the delegate's report on the Auxiliary meeting in Dallas recently. Mrs. F. J. Beyt, Port Arthur, succeeded Mrs. Williford as president, and other officers installed were as follows: Mrs. D. E. Curry, Port Arthur, and Mrs. S. V. Granata, Beaumont, presidents-elect; Mrs. Frank Keith, Port Arthur, and Mrs. Arthur F. Reimers, Beaumont, first vice-presidents; Mrs. J. C. Hines, Nederland, and Mrs. L. H. Ledbetter, Beaumont, second vice-presidents; Mrs. C. E. Painton, Port Arthur, and Mrs. Eugene Lindsey, Beaumont, secretaries; Mrs. J. Y. Harper, Port Arthur, and Mrs. Dale Hager, Beaumont, treasurers; Mrs. L. C. Heare, Port Arthur, and Mrs. H. B. Williford, Beaumont, parliamentarians; Mrs. James Long, Port Arthur, and Mrs. H. W. Neidhardt, Beaumont, historians. Mrs. J. M. Lowenstein, Port Arthur, was installing officer.

The Beaumont chapter entertained with a western party and barbecue May 30. Mrs. R. T. Lombardo was in charge of arrangements, and Mesdames Arthur F. Reimers, Kenneth Miller, Lewis Williams, and D. C. Hager planned decorations.

Kerr-Kendall-Gillespie-Bandera Counties Auxiliary

The Woman's Auxiliary to the Kerr-Kendall-Gillespie-Bandera Counties Medical Society met May 2 and heard an address by Mr. Walton Daniel on "The Operation of the Blood Bank."

Mrs. Duan Packard presented the gavel to the incoming president, Mrs. Hugh A. Drane. Hostesses for the meeting were Mesdames C. B. Matthews, R. E. Guill, H. P. Reid, and C. F. Culver.

Approximately thirty-five guests were entertained at the home of Dr. and Mrs. David McCullough, Kerrville, June 8, when members of the Woman's Auxiliary to the Kerr-Kendall-Gillespie-Bandera Counties Medical Society honored their husbands at a buffet supper—Mrs. Russell E. Guill, Secretary.

Liberty-Chambers Counties Auxiliary

A chicken barbecue was given at the farm home of Dr. and Mrs. Melvin Anchell, Cleveland, by members of Liberty-Chambers Counties Auxiliary on May 14 to honor their husbands. Eighteen persons were present.

McLennan County Auxiliary

Mrs. L. K. Richards spoke on the League of Women Voters at the April 23 meeting at the home of Mrs. M. A. Magid in Waco of McLennan County Auxiliary. Another speaker was Clinton Breeding, whose topic was the new YMCA.

Hostesses for the meeting were Mesdames M. W. Colgin, J. L. Kee, William Gandy, Paul Murphey, Joseph Woodward, G. T. McMahan, Ernest Johnson, Ross Shipp, and W. G. Trice. Proceeds from the luncheon were added to the Nurses Fund, a project of the auxiliary. Thirty-six members attended.

Navarro County Auxiliary

Officers of the Navarro County Auxiliary were elected at a meeting April 4 in the home of Mrs. J. Wilson David, Corsicana.

Elected to serve for the year were Mrs. C. L. Gary, Jr., president; Mrs. Paul H. Mitchell, first vice-president; Mrs. S. H. Burnett, secretary-treasurer; Mrs. Dan Hamill, legislative chairman; Mrs. Will M. Miller, public relations; Mrs. L. E. Kelton, Jr., Bulletin; Mrs. W. R. Sneed, chairman of "Today's Health"; Mesdames W. R. Sneed, J. Wilson David, T. O. Wills, and W. K. Logsdon, social chairmen. Mesdames Mitchell and Gary will serve as program chairmen. All officers are of Corsicana.

Mrs. C. L. Gary, Corsicana, reported on the state Auxiliary meeting when the Navarro County Auxiliary met June 6 at the home of Mrs. S. H. Burnett, Corsicana. Mrs. Gary presided over the meeting, which was attended by eight members. Mrs. Dan Hamill discussed medical legislation pending in Congress. Refreshments were served during a social hour.

Orange County Auxiliary

The Orange County Auxiliary held its monthly meeting in the home of Mrs. G. Y. Swickard, Orange, on April 15, with Mrs. W. B. Ebert as co-hostess. Mrs. Leo J. Peters presided.

Mrs. T. O. Woolley was in charge of the program, which was on "Interesting Vacation Spots." Refreshments were served during the afternoon to the seven members attending.

A covered dish luncheon was held May 13 in the home of Mrs. H. W. Pearce, with Mrs. E. H. Kent as co-hostess.

Members of the Orange County Auxiliary were entertained May 27 at the home of Mrs. Wynne Pearce in Orange at a buffet-style luncheon. The final business meeting for the year was conducted by Mrs. Leo J. Peters. Officers installed were Mrs. E. H. Kent, president; Mrs. David Bennett, vice-president; Mrs. W. H. Siddon, secretary-treasurer; and Mrs. T. O. Woolley, parliamentarian. Orchid corsages were presented to each new officer and also to Mrs. C. M. Covington, district council woman, and Mrs. Peters, outgoing president.

Mrs. Peters explained work with spastic children and members discussed establishment of a center in Orange for their care. Committees were appointed to carry on the work during the summer months. A report of the essay contest for high school students sponsored by the Orange County Auxiliary was heard.

Eighteen members and guests were present.

Smith County Auxiliary

The Woman's Auxiliary to the Smith County Medical Society entertained in April with a guest coffee at the home of Mrs. W. Howard Bryant, Tyler. The committee in charge of arrangements included Mesdames Albert M. McCulloh, Madison Lee, G. W. Burch, and W. Howard Bryant. Officers of the auxiliary formed the receiving line.

Taylor-Jones Counties Auxiliary

New officers of the Taylor-Jones Counties Auxiliary were installed by Mrs. T. Wade Hedrick at the May 13 meeting in Abilene. Mrs. J. D. Magee is outgoing president and Mrs. Travis Smith is the newly-installed president.

An announcement was made that the Taylor-Jones Counties Auxiliary received two blue ribbon awards at the annual session in Dallas for nurse recruitment and legislative activities.

Plans were made for a meeting of the Woman's Auxiliary to the Thirteenth District Medical Society to be held in Abilene on May 28.

More than thirty members and guests attended. Hostesses included Mesdames L. F. Johnson, George D. Thurman, R. Lee Rode, L. J. Pickard, M. L. Smith, S. W. Bailey, J. M. Estes, and W. A. V. Cash.—Mrs. C. A. McFadden, Publicity Secretary.

Travis County Auxiliary

The Woman's Auxiliary to the Travis County Medical Society met May 20 at the home of the president, Mrs. Joe Thorne Gilbert, Austin.

The president gave an annual report of activities incorporating into it the reports of other officers. The year's activities which were reviewed included participation by members of the auxiliary in drives such as the Community Chest, the Heart Association, the diabetes, and the tuberculosis; the weekly services of members of the auxiliary as canteen aides at the Travis County Blood Bank; and cooperation with the Association of American Physicians and Surgeons in sponsoring the high school essay contest on "Why the Private Practice of Medicine Furnishes This Country with the Finest Medical Care." The auxiliary cooperated during the year with the supervisor at Brackenridge Hospital on nurse recruitment and in civil defense work and furnished helpers at St. David's Hospital for book cart and tray decoration work. The report also outlined contributions made to the Child and Family Service, the medical library fund, the medical student loan fund, the auxiliary philanthropic fund, the cancer fund, and the essay contest prize.

New officers for the coming year installed at this meeting were Mesdames A. H. Neighbors, Jr., president; Mrs Charles Dildy, president-elect; Mrs. T. J. Archer, first vice president; Mrs. S. W. Bohls, second vice-president; Mrs William Kelton, secretary; Mrs. W. B. Hahn, treasurer; Mrs G. E. Tipton, publicity chairman; Mrs. James Eckhardt, parliamentarian; Mrs. William Gambrell, legislative chairman; Mrs. Albert LaLonde, publications; and Mrs. Horace Cromer, public relations.

The hostess committee was composed of Mesdames H. L. Klotz, Banner Gregg, R. A. Cooper, George Decherd, John Garcia, Fred P. Helm, B. F. Johnson, David Johnson, Sam Key, J. E. Kreisle, Truman Morris, Robert B. Morrison, P. J. Paris, B. M. Primer, Jr., W. D. Roberts, Raleigh Ross, Milton Turner, John Thomas, and L. P. Walter.—Mrs. T. N. Watt.

Washington-Burleson Counties Auxiliary

Members of the Washington-Burleson Counties Auxiliary and their husbands met for luncheon April 28 in Brenham after which an installation of officers of the auxiliary took place.

Dr. E. P. Tottenham gave the invocation and Mrs. Tottenham presided at the business meeting. Mrs. Sam Toubin was in charge of the installation. Those installed included Mesdames G. V. Pazdral, president; C. W. Schoenvogel, vice-president; E. P. Tottenham, recording secretary; W. F. Hasskarl, Sr., corresponding secretary; W. F. Hasskarl, Jr., treasurer; Waldo A. Knolle, press reporter; and W. J. Embrey, parliamentarian. The year's work was reviewed.—Mrs. E. P. Tottenham.

Wichita County Auxiliary

Dr. George Seibold, Wichita Falls, was guest speaker at the April meeting of the Wichita County Auxiliary in Wichita Falls. Dr. Seibold discussed "The Peculiarities of Allergy." He was introduced by Mrs. John R. Reagan, program chairman.

Special guests were Mrs. O. W. Robinson, Paris, President of the Woman's Auxiliary to the Texas Medical Association, and Mrs. W. W. Fitzpatrick, Paris. Hostesses were Mesdames Owen Berg, E. A. Cox, Otto Egdorf, Robert L. Hargrave, W. G. Harrison, A. F. Leach, R. W. Manar, L. D. Parnell, Wayne A. Reser, and J. G. Holt.

Thirteenth District Auxiliary

About fifty women attended the Thirteenth District Auxiliary meeting May 28 in Abilene.

Mrs. Travis Smith, Abilene, president of Taylor-Jones Auxiliary, introduced those at the speakers' table: Mrs. Robert Farris Thompson, El Paso, State President; and some of the past presidents of the Taylor-Jones Auxiliary.

Reports from county auxiliaries in the district were given by Mrs. W. G. Phillips, Fort Worth, for Tarrant County, Mrs. P. M. Kuykendall, Ranger, and Mrs. D. J. Youngblood, Breckenridge, for Eastland-Callahan-Stephens-Shackelford-Throckmorton Counties, and Taylor-Jones Counties.

Upon the presentation of a slate of officers by the chairman of the nominating committee, Mrs. H. Ray Buzbee, Abilene, the following were elected by acclamation: Mrs. William Rosenblatt, Wichita Falls, council woman; Mrs. Jack Crow, Abilene, vice-council woman; Mrs. P. M. Kuykendall, Ranger, secretary-treasurer; and Mrs. Stephen Pow-

ers, Wichita Falls, publicity secretary. The next district meeting will be in Wichita Falls.

The topic of Mrs. Thompson's speech was her slogan for the year, "Be a Better Citizen Today, Not Tomorrow." In it she referred to the objectives of the Auxiliary relating to the policies of the Texas Medical Association, as outlined by Dr. T. C. Terrell, the President, including citizenship, the Association of American Physicians and Surgeons essay contest, better health, nurse recruitment, civil defense, public relations, and the loan funds for medical students, needy widows of doctors, and the State Medical Library.

Other objectives of the Auxiliary mentioned by Mrs. Thompson included two new ones, mental health with child guidance clinics and geriatrics. She recommended that Auxiliary members lend support to the staffs of homes for the aged and supply equipment and entertainment.

Mrs. Thompson reminded Auxiliary members that during the historic year in which the Texas Medical Association will celebrate its first 100 years, they should try to distinguish themselves. She pleaded for them to see that each eligible voter in their families exercises his voting right.

AUXILIARY DEATHS

Mrs. Walter J. Stork, the wife of the Houston radiologist, died June 6, 1952, in a Houston hospital after undergoing surgery.

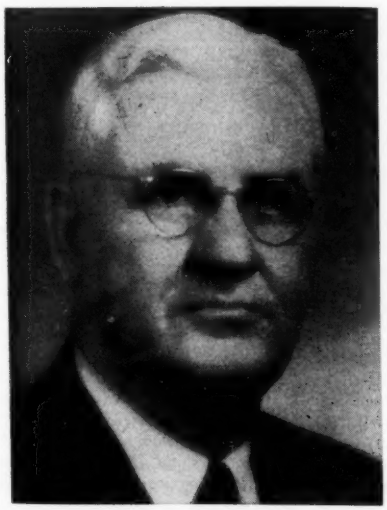
A native of Galveston, she was a charter member and founder of the Elva A. Wright Auxiliary to the City Tuberculosis Hospital and was organizational treasurer at the time of her death. She also was a member of the Woman's Auxiliary to the Harris County Medical Society, the Caduceus Club, and the Silver Spur. Survivors besides her husband are a son, Walter J. Stork, Jr.; her mother, Mrs. Augusta Lobenstein, and two brothers, Ed Lobenstein and Walter Lobenstein, all of Galveston.

DEATHS

W. M. GAMBRELL

Dr. William Mooney Gambrell, Austin, Texas, member of the Board of Trustees and former president of the Texas Medical Association, died July 25, 1952, of a heart attack. Although Dr. Gambrell had not been especially well in recent months, his death was sudden and unexpected.

The son of John Newton and Mary C. (Mooney) Gambrell, Dr. Gambrell was born August 4, 1890, in Waco. He received his early education in the Lockhart public schools. In 1910 he entered the Southwest Texas Normal



DR. WILLIAM M. GAMBRELL

College, San Marcos, obtained a first grade teacher's certificate, and the next year stayed out of school to teach. After his graduation from college in 1912, he taught science at Lockhart High School, later serving as superintendent of the Lockhart schools. To complete his premedical requirements, Dr. Gambrell did correspondence work during the winter and attended the University of Texas, Austin, during the summer. He resigned from his position in Lockhart in 1916 to enter the University of Texas Medical Branch, Galveston. After three years he was appointed a senior intern, and after his graduation in 1920, he went to the Lying-In Hospital, New York, for additional training. Dr. Gambrell began general practice in Belton in 1920, moving eleven years later to Austin. Recently Dr. Gambrell had specialized in surgery, obstetrics, and gynecology.

Dr. Gambrell always had been active in medical organizations. He was past president of the Bell County, Seventh District, and Travis County Medical Societies, as well as of the Texas Medical Association. In 1934 he was secretary of the Association's Section on Surgery. In 1948 Dr. Gambrell was made councilor of the Seventh District, a post he held until he was named president-elect of the state organization a year later. He was a member of the Phi Beta Pi fraternity, Alpha Omega Alpha honorary medical fraternity, Texas Society of Obstetricians and Gynecologists, and American Medical Association, and a fellow of the American College of Surgeons. He was a member of the Baptist Church, a thirty-second degree Mason, and a member of the Rotary Club.

Dr. Gambrell is survived by his wife, the former Miss Patti McClung, whom he married November 27, 1913, in Jacksonville. Mrs. Gambrell was president of the Woman's Auxiliary to the Texas Medical Association the same year Dr. Gambrell headed the Association. Other survivors are a daughter, Mrs. David Wilcox, Hudson, Wis.; two sons, Dr. William Mooney Gambrell, Jr., Luling, and John Brewster Gambrell, Tyler; and four grandchildren.

R. R. ALLEN

Dr. Robert Russell Allen, Sweetwater, Texas, the brother of two Texas physicians, died in a Sweetwater hospital April 4, 1952, six weeks after suffering a heart attack.

Dr. Allen was born August 12, 1878, at May to Mr. and Mrs. S. B. Allen. He received a medical degree from the University of Texas School of Medicine, Galveston, in 1908, and began practice in Roby that same year. In 1924 he moved to Sweetwater and maintained his medical activities

there until shortly before his death. Formerly the health officer for Fisher County, Dr. Allen at different times had been physician for the Orient and Santa Fe Railroad companies. He also had served as chairman of the board of directors for the Sweetwater Municipal Hospital.

During World War I, Dr. Allen served eighteen months in Germany, being discharged with the rank of major. He was a member of the Medical Detachment of the Sixth Engineers and participated in six major battles, including those of Champagne-Marne, Saint Mihiel, and Meuse-Argonne. Dr. Allen was awarded the silver star for "distinguished and exceptional gallantry" at Mezy, France, where he set up and maintained a first aid station, refusing to retreat even when enemy fire made impossible the removal of patients by ambulance.

Dr. Allen was physician for the Nolan County Selective Service board during World War II. He was a member of the Veterans of Foreign Wars and the American Legion. His medical affiliations included the Texas and American Medical Associations through Nolan - Fisher - Mitchell Counties Medical Society, of which he was president for several terms. He was a member of the Masonic Order and of the Methodist Church.

On November 16, 1902, at May, Dr. Allen married Miss Lucy Lilly. His wife survives; also, their son, Robert R. Allen, Jr., Sweetwater; his four brothers, Dr. Homer B. Allen, Brownwood; Dr. Will L. Allen, Rising Star; O. C. Allen, May; and E. Otis Allen, Norton; and his two sisters, Mrs. V. Earl Earp, Monahans, and Mrs. Percy Wagnon, Temple.

R. R. MAY

Dr. Ross Reynolds May, Whitewright, Texas, died from a coronary occlusion in his home April 16, 1952.

Dr. May was the second son of Dr. Reynolds May and Henrietta May and was born in Whitewright on May 28, 1886. After attending the Whitewright public schools, he was awarded the bachelor of science degree from Grayson College, Whitewright. He also studied at the University of Texas, Austin. Dr. May received his medical degree from Tulane University of Louisiana School of Medicine, New Orleans, in 1912. In later years postgraduate studies were pursued in New Orleans and New York.

After an internship at Baylor Hospital, Dallas, Dr. May practiced in Whitewright with the exception of brief periods in Ranger and Sherman. Until his father's death in 1939 the Drs. May were associated in practice.

President in 1934 of the Grayson County Medical Society, Dr. May was as well a member of the Texas Medical Association and the American Medical Association. He served as a lieutenant, junior grade, in the United States Navy during World War I. Dr. May was a past worshipful master in the Masonic Lodge, a Shriner, past president of the Rotary Club, and for twenty-five years a steward in the Methodist Church. He was a member of Nu Sigma Nu fraternity.

Among survivors are Dr. May's wife, the former Miss Pauline Lenox, whom he married August 27, 1919, in Pine Bluff, Ark.; a foster son, Lt. Davis Parrish, Boston; and two brothers, Dr. E. O. May, Tishomingo, Okla., and the Rev. H. G. May, Dallas.

R. P. LOCKEY

Dr. Robert Peyton Lockey, Voth, Texas, died in Beaumont March 12, 1952, of carcinoma of the prostate gland.

Born November 25, 1870, in Marianna, Fla., Dr. Lockey was the son of Joseph B. and Tabitha (Calloway) Lockey. After attending school in Marianna and DeFuniak Springs, Dr. Lockey was graduated from the Kentucky School of Medicine, Louisville, in 1894. Later he took graduate work at Tulane University, New Orleans. Dr. Lockey practiced six years in Shelbyville and twenty-five years in Nacogdoches before joining the Kirby Lumber Corporation as a physician. In his twenty-five years of service with the lumber concern he was stationed at five locations in Hardin, Tyler, and Jefferson Counties.

Affiliated with the Texas and American Medical Associations, Dr. Lockey was a member successively of the Nacogdoches, Jasper-Newton, and Hardin-Tyler Counties Medical Societies. He was president of the latter organization in 1943. He was co-owner of a hospital in Nacogdoches and health officer there for three years. He was a member of the Baptist Church and a Mason.

Mrs. Lockey, the former Miss Mittase Holt, whom Dr. Lockey married December 25, 1901 in Nashville, survives, as do a son, Joseph Holt Lockey, Liberty; one granddaughter; and two sisters, Mrs. Ella Harvey, Chipley, Fla., and Mrs. Valerie Coleman, Tallahassee, Fla.

C. E. DAVIS

Dr. Charles Edward Davis, Linden, Texas, died April 27, 1952, of cerebral hemorrhage.

Born February 22, 1869, in Bryans Mill, Texas, to Charles and Louise Davis, Dr. Davis attended school in Linden and in 1901 was graduated from Memphis Hospital Medical College, Memphis. Before entering the medical profession, Dr. Davis taught school at Cusseta, Pearl Hill, and Huffines in Cass County. After graduation from medical school, Dr. Davis practiced in Almira before moving to Linden, where he practiced for more than fifty years. He took postgraduate studies in New Orleans, Chicago, Washington, D. C., and Rochester, Minn.

A member for many years of the Texas and American Medical Associations through Cass-Marion Counties Medical Society, Dr. Davis served several times as president of his county society and was elected to honorary membership in the Texas Medical Association in 1951. He was a member of the Tri-State Medical Assembly. In 1951 he was honored by citizens of Cass County at a parade and dinner in appreciation for his years of service. Dr. Davis was a Master Mason, and served as president of the Chamber of Commerce twice, president of the Linden School Board for three years, and president of the Cass County Fair Association. He was a Methodist.

His first wife, the former Miss Pearl Fowler, Linden, whom he married December 19, 1895, died in 1930. On December 7, 1935, he married Mrs. Ruth Duncan Nelson of Linden, who survives, as do a son and daughter by his first marriage, Edward Davis, and Mrs. Robert Salmon, Linden; a sister, Mrs. Abb Elliott, Bovina; and three grandchildren.

J. B. BALDWIN

Dr. John Browning Baldwin, Marshall, Texas, died from portal cirrhosis of the liver June 26, 1952, in a Galveston hospital.

Born March 4, 1887 in Karnack to Dr. Benjamin H. and Mrs. Amanda (Scott) Baldwin, Dr. Baldwin attended Marshall public schools. He was graduated in 1911 from the University of Texas Medical School, Galveston. After an internship at St. Mary's Hospital, Milwaukee, Wis., Dr. Baldwin began his medical practice in Marshall, doing extensive work in both medicine and surgery. In 1916 he studied at the New York Postgraduate Hospital and the following year was house physician at Bellevue Hospital, New York. Upon his graduation in 1922 from the Manhattan Eye, Ear, Nose, and Throat Hospital, New York, he became a specialist in that field. He practiced for short periods in Karnack, Dallas, and Cushing, Okla., but was located in Marshall most of his career.

Dr. Baldwin was a member of the Harrison County Medical Society, serving the society as president in 1930, 1942, and 1943; Texas Medical Association as an honorary member; American Medical Association; Association of American Physicians and Surgeons; Texas Society of Ophthalmology and Otolaryngology; and Texas Air-Medics Association. He was also a member of the Alpha Kappa Kappa medical fraternity, American Legion, Rotary International, Chamber of Commerce, and Protestant Episcopal Church. In 1916 he was county health officer for Harrison County. During World War I, Dr. Baldwin was in active service in France with the Army Medical Corps, having enlisted on March 20, 1918, and being honorably discharged with the rank of first lieutenant on March 2, 1919.

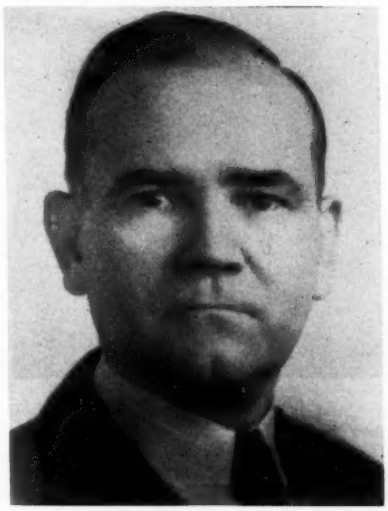
Dr. Baldwin married the former Miss Lucille Jones on February 20, 1918, in Marshall. She survives as do one daughter, Mrs. Mary Jane Sanders, Dallas, and two sons, Phillip and Scotty Baldwin, Marshall.

E. H. MERRICK

Dr. Edward H. Merrick, San Antonio, Texas, died June 11, 1952, of heart failure.

Dr. Merrick was born November 15, 1884, on a farm near Clyde, the son of Mr. and Mrs. J. W. Merrick. He attended Simmons College in Abilene, the University of Texas in Austin, and the University of Texas Medical Branch in Galveston. He practiced in Clyde, Winters, Abilene, and Potosi before locating in San Antonio.

Long a member of the Texas and American Medical Associations through Bexar County Medical Society, Dr. Merrick also was affiliated with the Fifth District Medical Society. He was a Mason and a member of the Shrine and belonged to the Church of Christ.



DR. EDWARD H. MERRICK

Surviving Dr. Merrick are his wife, the former Miss Rosa Lee Hurley, whom he married November 17, 1929, in San Antonio; a son, Edward, Jr., San Antonio; six sisters, Mrs. Oscar Pyeatt, Mrs. Dessie Patton, and Mrs. Ubah Nunn, all of Clyde; Mrs. Maude Young, Lubbock; Mrs. Lora Randolph, Abilene; and Mrs. Mamie Bell Hess, Modesto, Calif.; and two brothers, Hardy Merrick, Abilene, and Ira Merrick, Garden City, Kan.

J. K. GRIFFITH

Dr. Joseph Kimberlin Griffith, long-time Robert Lee, Texas, physician, died April 12, 1952, in a local hospital as a result of coronary sclerosis.

Dr. Griffith was born January 13, 1866, near Clinton, Mo., to Alexander and Margaret (Drake) Griffith; his mother was a descendant of Sir Frances Drake. From 1886 until 1888 he was a student at Wentworth Military Academy, Lexington, Mo. While studying medicine, he drove a mule-car for the Kansas City transportation system to help pay his expenses; his medical degree was granted in 1891 by the Kansas City Medical College, later absorbed by the University of Kansas School of Medicine, in which Dr. Griffith maintained an interest until his death. He obtained a dental degree in 1896 at the Kansas City Dental College and practiced dentistry for four years; because of eye trouble he returned to the general practice of medicine. Postgraduate work in medicine was taken at Baylor University College of Medicine, Dallas.

The young doctor began his medical career in Dayton, Mo., and was located also in Arkansas during his early years of practice. In 1906 he and his wife, the former Miss Carrie Alice Sloan, whom he had married December 24, 1891, in Creighton, Mo., drew a claim in the then Oklahoma Territory, and the following year they moved to Randlett, Okla.,

DR. JOSEPH K. GRIFFITH

where they lived until 1920. In that year they came to Texas, living in Lawn and Eden until 1927, at which time they moved to Robert Lee. There Dr. Griffith remained active in medicine until forced by failing health to retire in 1949.

Elected in 1945 to honorary membership in Tom Green-Eight County Medical Society and the Texas Medical Association, Dr. Griffith earlier had been affiliated with Taylor County Medical Society. He formerly was the county health officer and chairman of the Coke County Democratic Party. Dr. Griffith had been honored for his seven years' service to the Selective Service system. He was instrumental in obtaining for the local high school football stadium lights and bleachers, and in 1949 it was renamed Griffith Stadium. A member of the Masonic Lodge, he was active in the Methodist Church. Dr. Griffith was a member of the Lions Club and of the Chamber of Commerce. His interests had included

deer hunting, fishing, baseball, and raising parakeets and flowers.

Surviving Dr. Griffith are his wife; a son, Byron Griffith, Long Beach, Calif.; three daughters, Mrs. D. W. Parrish, Abilene; Mrs. D. R. Wells, Quanah; and Mrs. D. P. Walling, Carlsbad, N. Mex.; a sister, Mrs. G. V. Berry, St. Louis; six grandchildren; and five great grandchildren.

R. M. HARGROVE

Dr. Reuben Morgan Hargrove, Houston, Texas, the father of a Houston physician, died from a heart attack in a local hospital May 6, 1952.

Dr. Hargrove, the son of Carey Crain and Mima Rebecca (Walker) Hargrove, was born January 19, 1884, in Paige. His early education was attained in the Smithville public schools and he attended Baylor University, Waco. Dr. Hargrove was graduated from the University of Texas School of Medicine, Galveston, in 1912. At one time he was a demonstrator of anatomy at the University of Texas; he later was appointed professor of anatomy at the University of Oklahoma and completed studies for a bachelor of science degree while teaching there. An internship at Kensington Hospital, Philadelphia, was followed by his appointment as house surgeon for Hotel Dieu, Beaumont. He practiced for short periods in Call and Beaumont; since 1919 he had practiced in Houston, since 1925 specializing in diseases of the ear, nose, and throat.

The former secretary and vice-president of Harris County Medical Society, Dr. Hargrove also was a member of the

DR. R. M. HARGROVE

Texas and American Medical Associations and was affiliated with the Houston Academy of Medicine. A fellow of the American College of Surgeons, he was certified by the American Board of Otolaryngology. Dr. Hargrove was a staff member of St. Joseph's Infirmary and Southern Pacific Hospital, Houston. During World War I he saw active military service. He belonged to Phi Beta Pi medical fraternity and Sigma Chi fraternity. A member of the Baptist Church, Dr. Hargrove was also a member of the Masonic Order, Scottish Rite, and Shrine.

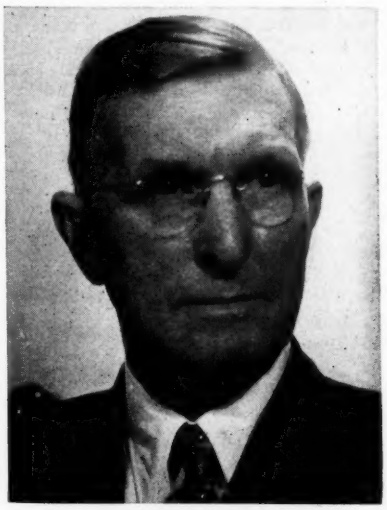
Miss Mildred Montgomery and Dr. Hargrove were married at Call on August 29, 1915. His wife survives; also a son, Dr. Carey J. Hargrove, Houston; two daughters, Mrs. Mildred Clark, Carlsbad, N. Mex., and Mrs. Ruth Manis, Katy; his mother, Mrs. C. C. Hargrove, Houston; three brothers, S. M. Hargrove, Texarkana, and J. T. Hargrove and Charles C. Hargrove, San Antonio; two sisters, Mrs. J. N. Hargrove and Mrs. W. F. Kahlden, Houston; and six grandchildren.

W. T. SHELL, SR.

Dr. William Thomas Shell, Sr., died July 3, 1952, at his home in Corsicana, Texas.

Dr. Shell, born in Pigeon Creek, Ala., February 3, 1874, received his preliminary education at Howard College, Birmingham. Upon his graduation from old Atlanta Medical College, later Emory University School of Medicine, in 1895, he began his medical practice in Pigeon Creek, relocating one year later in Corsicana.

Dr. Shell was secretary and president of both the Twelfth District and Navarro County Medical Societies. He also held membership in the Texas and American Medical Associations, Southern Medical Association, American Association of Railway Surgeons, and Texas Railway and Traumatic Surgical Association, and was a fellow of the American College of Surgeons. From 1909 to 1913 he was city health officer for Corsicana. He served as president of the



DR. W. T. SHELL, SR.

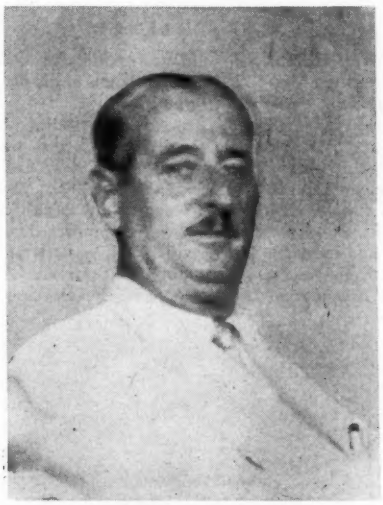
board of managers of the county hospital from its organization until 1920, and in 1927, he and others established the Corsicana Hospital and Clinic, which he headed since that time. He was local surgeon for the Cotton Belt and Burlington-Rock Island Lines. During his service to the Patriarchs Militant of Texas, he was surgeon with the rank of major. An Odd Fellow more than fifty years, Dr. Shell also was a thirty-second degree Mason and Knight Commander of the Court of Honor, a member of the Lions Club, Crippled Children's Society, and Baptist Church.

Dr. Shell is survived by his wife, the former Miss Kate B. Taylor, whom he married in Texarkana in 1900; two sons, Dr. William T. Shell, Jr., a surgeon at the Corsicana Hospital and Clinic, and Rufus D. Shell, Corsicana; a daughter, Mrs. J. B. Ellett, Dallas; four sisters; six grandchildren; and a great-grandchild.

H. W. HARPER, JR.

Dr. Henry Winston Harper, Jr., Fort Worth, Texas, died at his home May 9, 1952.

A great-great grandson of Patrick Henry and son of the late Dr. Henry W. Harper, dean emeritus of the University of Texas Graduate School, and Mrs. Susan Randolph West Harper, Dr. Harper was born in Westland, Va., on June 25, 1896. He attended Kemper Military School, Boonville, Mo.; the University of Texas, Austin; the University of Missouri, Columbus; and Washington University School of Medicine, St. Louis, from which he received his medical degree in 1922. He interned at Missouri Baptist Sanitarium and served as assistant to Dr. Willard Bartlett, St. Louis.



DR. H. W. HARPER, JR.

Dr. Harper moved to Fort Worth, where he practiced for twenty-seven years, specializing in surgery. He was in the military service one year, during World War I.

A member since 1928 of the Texas Medical Association through Tarrant County Medical Society, Dr. Harper also was a member of the American Medical Association and the American College of Surgeons. He held membership in Beta Theta Pi fraternity, Lions Club, Exchange Club, and the Methodist Church.

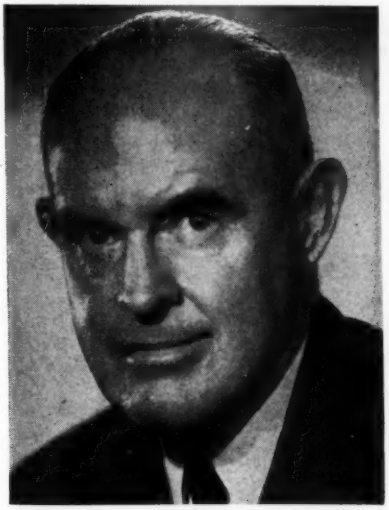
He is survived by his wife, the former Miss Eva Underwood; a son, Dr. Henry Winston Harper, III, Flint, Mich.; a daughter, Mrs. Robert Tribble, Columbus, Mo.; a sister, Mrs. Richard Pettway, Austin; and two grandchildren, Henry Winston Harper, IV, and Marie Harper, Flint, Mich.

D. SPANGLER

Dr. Davis Spangler, well known Dallas, Texas, radiologist, died April 13, 1952, of a heart ailment which had recurred recently after an initial attack last autumn.

A native of Washington, D. C., Dr. Spangler was born September 30, 1892, the son of William A. and Mary (Davis) Spangler. He attended high school in Bonham, Texas, and was graduated in medicine from the University of Texas Medical Branch in Galveston in 1913. After serving two internships, one at John Sealy Hospital in Galveston and the other at St. Vincent's Sanitarium in Sherman, Dr. Spangler began practice at Sherman, where he remained until 1921 except for two years spent in military service. He enlisted in the Army in 1917, served at base hospitals in France, and was released in 1919 with the rank of captain. In 1921 Dr. Spangler moved to Dallas, where he had been in the practice of his specialty ever since. He was associated with the Dallas Medical and Surgical Clinic until 1938, when he opened offices in the Medical Arts Building. More recently he had opened additional offices in the Gaston Avenue Medical Building and at 2512 Oak Lawn Avenue and had had Drs. Glenn D. Carlson, William McPheron, and William H. Barekman associated with him.

Upon being graduated from medical school, Dr. Spangler joined the Texas Medical Association through Grayson



DR. DAVIS SPANGLER

County Medical Society. He had maintained his membership in the state organization and in the American Medical Association, more recently through Dallas County Medical Society, which he served as president in 1943. He was secretary of the Section on Radiology and Physiotherapy of the state group in 1937 and again in 1950, and was county chairman of procurement and assignment of physicians during World War II. Dr. Spangler was a member of the Intercity X-Ray Club, Texas Radiological Society, and American Roentgen Ray Society, former vice-president of the Radiological Society of North America, counselor for Texas for the American College of Radiology, and both a diplomate and fellow of the American Board of Radiology. He was a member of the Dallas Southern Clinical Society, clinical assistant professor of radiology at Southwestern Medical School of the University of Texas, and a member of the medical staffs of Scottish Rite Hospital for Crippled Children, Children's Medical Center, and the Medical Arts Hospital.

Dr. Spangler was a thirty-third degree Mason and for years had been chief of the stage crew at annual Scottish Rite reunions in Scottish Rite Temple. He had long been a member of the board of Scottish Rite Hospital for Crippled Children, and was its second vice-president. He also had been potentate of Hella Temple Shrine. He belonged to the Methodist Church, Kiwanis Club, Dallas Athletic Club, Dallas Country Club, High Noon Club (of which he was president for 1951-1952), Knife and Fork Club, and Koon

Kreek Klub of Athens. Dr. Spangler was a sports fan, especially enjoying hunting and fishing.

Surviving Dr. Spangler is his wife, the former Mrs. Aurelia Cockrell Kurth, whom he married April 4, 1942.

W. D. GILL

Dr. William D. Gill, San Antonio, Texas, died of chronic myocarditis on May 24, 1952, in a San Antonio hospital.

Dr. Gill, one of the first men to experiment with transplanting eye corneas, was the son of a pioneer family of Dallas, Mr. and Mrs. James P. Gill, Sr. He was born November 24, 1896, in Dallas, attended Dallas schools, the University of Cincinnati, and Baylor University, and was graduated in 1917 from the Vanderbilt University School of Medicine, Nashville, where he served as instructor in chemistry while receiving his medical education. Dr. Gill was clinical assistant at New York Skin and Cancer Hospital and served an internship at New York Hospital.

DR. WILLIAM D. GILL

From 1919 to 1928 while Dr. Gill was serving in the Army medical corps he studied at Army Medical School, Washington; the Medical Field Service School, Carlisle Barracks, Pa.; and the University of Vienna, Austria. He later served as head of the Department of Ophthalmology, Station Hospital (now Brooke General Hospital) at Fort Sam Houston; chief of the Department of Ophthalmology and instructor in diseases of the eye at Army Medical School, Washington; and head of the eye clinic at Walter Reed General Hospital, Washington. Dr. Gill, who spoke four languages, spent two years in France and Germany during World War I and was awarded a silver medal for "conspicuous military service" by the state of New York in appreciation of his services at Boppard, Germany, in checking a serious epidemic. He also received the French Medaille d'Honneur for services rendered during World War I. In 1928 he resigned from the Army and moved to San Antonio, where he practiced until his death. Dr. Gill served as consultant to the Air Force School of Aviation Medicine, Randolph Field in 1948 and 1949 and was past chairman of the San Antonio Board of Health.

A member of the American Medical Association and the Texas Medical Association through Bexar County Medical Society, Dr. Gill held membership in the Southern Medical Association, Texas Society of Ophthalmology and Otolaryngology, and the American Academy of Ophthalmology and Otolaryngology. He was a diplomate of the American Laryngological, Rhinological and Otological Society, the American Board of Ophthalmology, the American Board of Otolaryngology, and the American Laryngological Association. A fellow of the American College of Surgeons, Dr. Gill also was a member of the Association for Research in Ophthalmology, and the American Society of Ophthalmologic and Otolaryngologic Allergy. He was an associate in the American Editors and Authors Association. Dr. Gill was a Presbyterian and a member of the Masonic Lodge, Scottish Rite Bodies, and Alzafar Shrine.

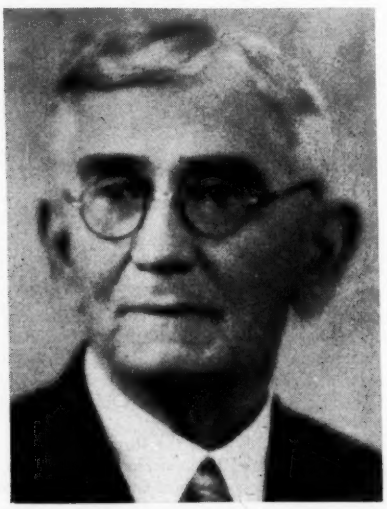
Survivors are a daughter, Mrs. Charles D. Nicholas, Houston; and two brothers, Drs. James P. Gill, San Antonio; and E. King Gill, Corpus Christi.

W. E. CARRUTH

Dr. Walter Everet Carruth, Brownsville, Texas, died of a heart attack on May 5, 1952, at the home of his daughter in Brownsville.

Born August 30, 1859, in Noxubee County, Miss., to W. A. and Mary (Burton) Carruth, Dr. Carruth was graduated in 1889 from Memphis Hospital Medical College. He practiced in Cotton Gin, Mexia, El Paso, Fort Worth, and Corpus Christi, serving as city and county health officer at the latter. In 1938, after fifty years of practice, Dr. Carruth retired and moved to Brownsville.

For many years a member of the Texas and American Medical Associations through Nueces, El Paso, and Tarrant



DR. WALTER E. CARRUTH

Counties Medical Societies, Dr. Carruth was elected to honorary membership in the State Association in 1936. He was a member of the Knights Templar and Shrine, and served as steward of the Methodist Church.

On June 17, 1883, in Hamburg, Ark., he married Miss Sallie Lewis Wooldridge, who preceded her husband in death in 1922. Dr. Carruth is survived by four sons, R. L. Carruth, El Paso; A. A. Carruth, San Francisco; and Walter Carruth and Wade Carruth, Corpus Christi; three daughters, Mrs. M. A. Compton, Brownsville; Mrs. Claude Lawrence, El Paso; and Mrs. William Fromberg, Austin; ten grandchildren; and nine great-grandchildren.

President's Page

BUILDING FOR FRIENDSHIP

Over the three-day span from September 19 to 21, we are dedicating in Austin the memorial library and headquarters building of the Texas Medical Association. Location of the Association's central office and library building has been something of a bone of contention for a number of recent years, and until ground was broken in Austin, some hoped that the Association might yet be centered in their locality. Nevertheless, whatever our individual feelings might be along these lines, the fact is inescapable that now the medical profession of Texas has a home for its headquarters and a house for its library which is second to none in this state, and all of us can be proud of it.

There has been some comment that this building is actually a "club" for a few lucky doctors. This is not true. It is true that an attractive, comfortable, and commodious structure has been provided to expedite the work of the employees of the Association and to welcome all members of the medical profession and their families. Our new home can and will become one of the great forces binding our profession together. At the same time, these facilities can cement more strongly our relations with many other groups of Texas citizenry, for the Board of Trustees wisely has seen fit in its plans for the building to make it an active instrument incurring good will at all levels. In short, the home of medicine in Texas should and will always have a welcome mat out for the people of Texas.

The dedication of our building should prove an auspicious one. Dr. Louis H. Bauer, President of the American Medical Association, and

United States Senator Lyndon B. Johnson will take part in the ceremonies. Other prominent persons in and out of the medical family will observe the occasion, either by participating in the programs or by attending them and visiting the building during the period of celebration. I hope every member of the Association and every member of the Woman's Auxiliary who possibly can will go to Austin for the ceremonies to see their building and to greet guests from other fields who have expressed their eagerness to tour it.

After the three-day observance is over, the building should be a headquarters for any physician who goes to Austin on business or pleasure—it is his and its services are his to enjoy.

In the new quarters, our library and all the services of the central office will grow and flourish. They will become a still greater source of help to practicing physicians all across the length and breadth of our state, and in so doing they will improve and extend the health care we can give the people of Texas. This is a building that will stand well over a hundred years. We must make it a landmark denoting the friendship and the desire for service underlying the spirit of the medical profession. A teacher, an attorney, a student, a business man, a farmer, must be made to feel equally at home in this headquarters of medicine in Texas and to recognize the high principles and desire for knowledge which guide the doctor in his practice.

If the home of medicine in Texas fulfills these ideals, it will truly reflect the qualities of friendship for and service to all Texans—the cornerstone of our profession.

T. C. Terrell